

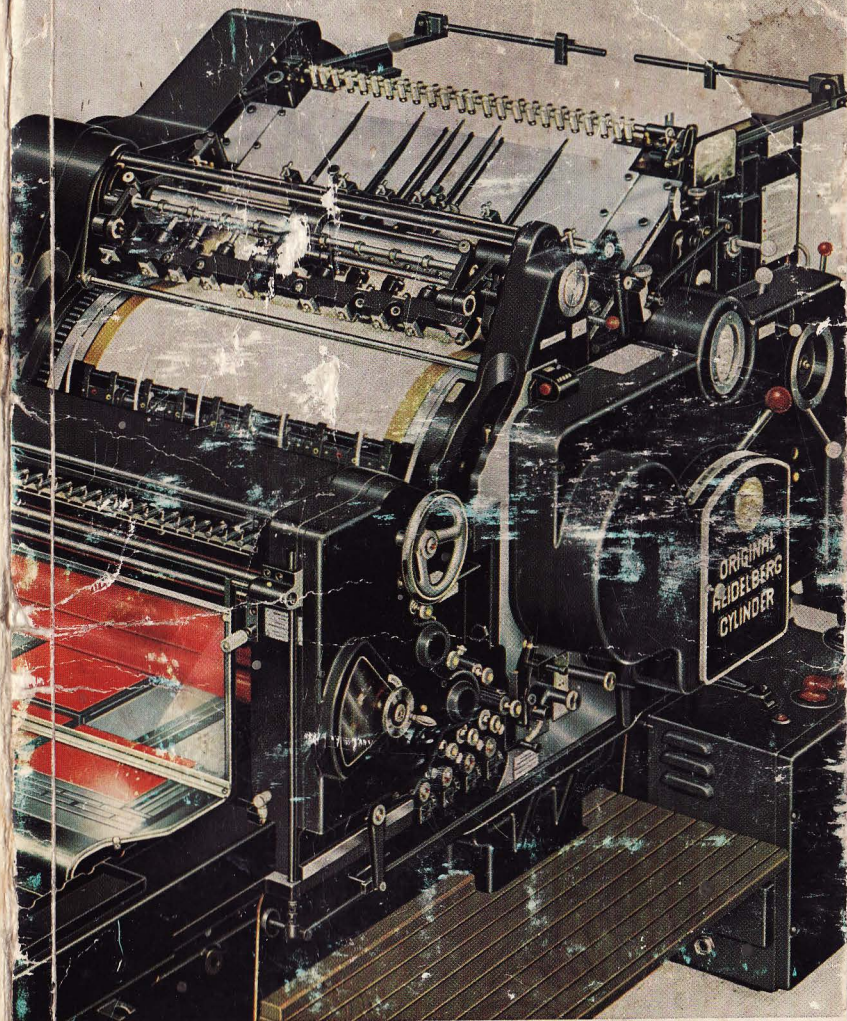
Original Heidelberg machines are entirely produced on moving belts in our spacious Wiesloch plant. Those who have seen these production lines operating appreciate the reasons for the outstanding reliability of our products. Each separate processing operation is closely overseen, and it is this complete and detailed supervision of production which has raised the quality of Heidelberg machines to the highest level.

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II



Hints for the Pressman

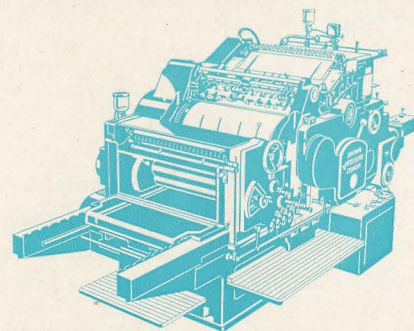
ORIGINAL HEIDELBERG

Original Heidelberg Cylinder Press

Hints
for the
Pressman



A summary of printing hints



Issued 1967

For Pressmen
operating
Original Heidelberg Cylinders

Profitable operation of a letterpress machine is not just accomplished by simply increasing its production speed to a maximum. In actual practice, a number of additional factors are of decisive importance:

1. High impressional strength and superb inking
2. Simple and time-saving adjustments when forms, sizes and stock are to be changed
3. Swift and convenient forme positioning
4. . . . and here is the essential plus feature:
short makeready times even with the heaviest forms

All these basic characteristics have made the OHC a byword for efficiency.

This modern automatic letterpress machine is noted for its superior quality printing achieved at maximum average speed. Its simple operation, complete accessibility, and, the short makeready times, reduce idle time to the very minimum. These short non-productive stoppages, coupled with high production speeds, account for the profitable operation of the OHC, as has been proven throughout the world time and again.

What has been thought of highly by printers more than 50,000 times, can't possibly be wrong for you.

7	Introduction
11	Specifications
12	Hints for all jobs to be done on automatic cylinders
29	Cylinder packing
32	Printing single-color half-tones
34	Multi-color printing
41	Printing of mixed forms
42	Printing of solids
46	Printing of typematter and rule formes
47	Overcoming slur
55	Printing thin stock
57	Printing on cardboard
59	Form positioning devices
61	Check your printing know-how (7 quiz questions)
62	Accessory for two-up feeding
64	Numbering
67	Carbon printing and ink fountain heating
68	Profitable embossing
75	Profitable cutting and creasing
82	Simultaneous printing and perforating/cutting
88	22 $\frac{1}{2}$ x 32 $\frac{1}{4}$ " Heidelberg cylinder cutter and creaser
91	Heidelberg two-color rotary/flatbed cylinder
94	Answers to quiz questions on page 61

Other important points in printing

99	Treatment of rubber rollers
102	Artex rollers
104	Make-ready systems
104	Levelling up
104	Hand-cut overlays
105	Mechanical chalk relief make-ready
107	Primaton makeready
110	3M makeready system
113	Static electricity
118	Alphabetical index
124	The Heidelberg range of presses

Introduction

Dedicated to pressmen operating Original Heidelberg Cylinders

More than 50,000* Heidelberg automatic cylinders have, so far, been supplied to all parts of the world.

This manual was printed as an aid to printers running these machines. We hope it will provide them with the information, and advice, they need in their daily work, in the same way as the "Hints for the Pressman", issued at the end of 1965 for printers operating the Original Heidelberg automatic platens.

This booklet is published in several languages and deals with the Heidelberg automatic single-color cylinders of the K-line (15 x 20 $\frac{1}{2}$ " to 18 x 23") and of the S-line (21 $\frac{1}{4}$ x 28 $\frac{1}{4}$ " to 22 $\frac{1}{2}$ x 32 $\frac{1}{4}$ "). In cases where the operating instructions for the K-line differ from those of the S-line, this is especially indicated. For the Heidelberg automatic two-color cylinders, a supplementary manual will be issued at a later date. Our "Hints" are addressed not only to the pressmen of large-scale organizations, they are also directed to the operators in the smallest, out-of-the-way print-shops where inks, plates, paper and printing aids cannot, perhaps, be had in the same qualities as elsewhere.

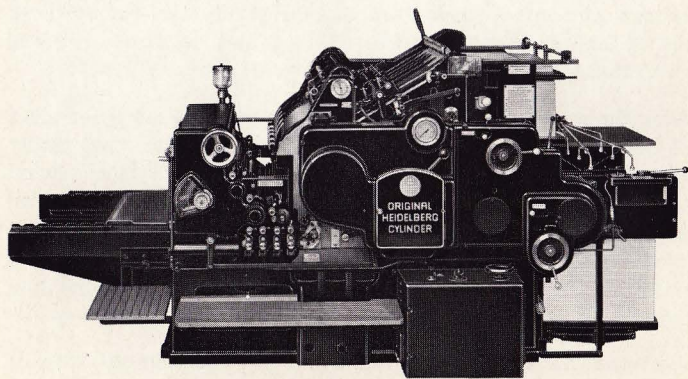
Accordingly, because these pages are addressed to a large number of our printer friends operating Heidelberg cylinders daily under widely different conditions, they can only serve for their general guidance: it must, of course, be left to the printer to make full use of the knowledge and experience he has gained himself. We have purposely confined ourselves to the specific of printing technology. This booklet is not intended to replace our operation manual, nor should it be regarded as a text-book on printing.

An alphabetical index at the end will enable you to locate speedily any item of information you may need.

Original Heidelberg Cylinders will cope with any printing, from simple work to the most difficult multi-color jobs. They are built for peak quality printing and, at the same time, for economic, fast operation and highest production output.

Pressmen running the OHC should, therefore, be qualified to meet certain requirements, though they are greatly aided in their work by the machine itself. The design of the Heidelberg automatic cylinder combines an ideally concentrated functional operation with neatly grouped controls. On one end of the machine there is the feeder and delivery unit. On the other end there is the form and inking system. In between, the operator has his service platform, with all essential controls within reach.

Mature design and numerous advantages permitting easy operation and control are plus features of the Original Heidelberg Cylinder. Absolutely safe transfer from feed to delivery is effected by grippers only, without marking. Enormous impression strength, excellent accessibility and simple operation allow shortest makeready time and quick get-away. Because of its rugged construction, its very heavy continually rotating impression cylinder, its massive base with four polished bed roller tracks, and



Original Heidelberg Cylinder S-line, viewed from service side

its liberally dimensioned inking system ensuring superb inking by four form rollers, not reversing on the form (18 x 23" OHC being equipped with three form rollers and one steel rider roller), the machine meets all the requirements for superb printing even on the heaviest forms. With the typebed and the impression cylinder synchronized and due to the highest precision production of all OHC components an accurate register is guaranteed even at maximum speed.

To assist changing quickly and easily from one job to another, three identical scales are provided on all OHCs – on the chase, the side lays, and on the feed table. For registering and final positioning away from the machine the Heidelberg form positioner comes in handy. Regulation of inking is effected with the aid of identical scales on both inking system and delivery. Preloading and wheeling away the delivery pile can be done while the machine is operating.

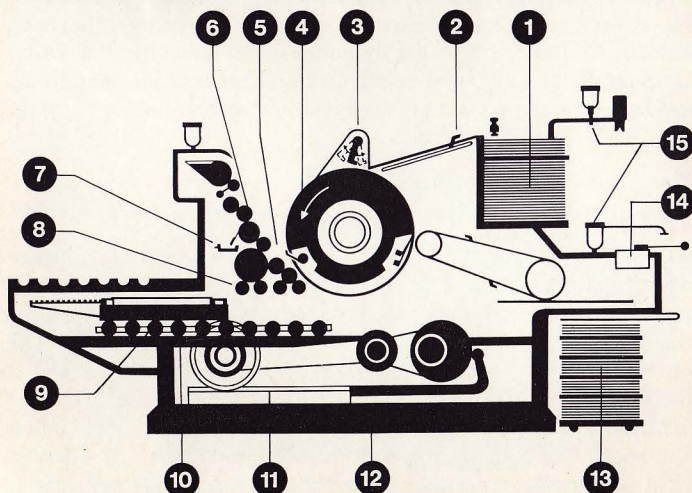
All Heidelberg automatic cylinders embody very high operational capacity on minimum floor space. K-line: 5,000 sheets per hour on 40 square feet. S-line: 4,600 sheets per hour on 71 square feet. Heidelberg cylinders are extremely versatile, because they not only print, but are also highly suitable for die-cutting, scoring, creasing, perforating, embossing and numbering. Information on further extra accessories are supplied in this booklet, or through your Heidelberg representative.

The diagram on page 10 shows the set-up and the operative characteristics of the Heidelberg automatic single-color cylinder.

① Feed pile and pre-loading device ② Four traveling grippers requiring no adjustment; positive sheet control from feed to delivery ③ Swinging transfer grippers ④ Heavy, continually rotating impression cylinder ⑤ Easily accessible impression cylinder ⑥ Cylinder inking system, S-line: 3 distributing rollers and 3 oscillating steel cylinders ⑦ Roller washing device ⑧ Four form rollers not reversing on the form (18 x 23" OHC being equipped with 3 form rollers and one rider roller) ⑨ Massive base with easily accessible form ⑩ Four polished bed rollers

⑪ Toothed rack to synchronize type bed movement and cylinder revolution ⑫ Heavy, reinforced base of special Heidelberg casting ⑬ Delivery pile with arrangement for continuous delivery ⑭ Central lubrication ⑮ Spray gun – S-line machines: optionally supplied with dry or wet spray gun or with both K-line: dry spray gun only.

Cross-section of single-color OHC, S-line



**Technical specifications
of the Original Heidelberg automatic single-color cylinder
(As in April 1967)**

	K-line	
Designation	KSB	KSBA
Maximum sheet size	15 ³ / ₄ x 23"	18 x 23"
Minimum sheet size	4 ⁷ / ₈ x 6"	5 ¹ / ₂ x 7 ¹ / ₁₆ "
Inside measurements	15 x 21 ⁵ / ₃₂ "	17 ¹ / ₈ x 21 ⁵ / ₃₂ "
Standard chase	15 x 21 ¹ / ₈ "	17 ¹ / ₈ x 21 ⁵ / ₃₂ "
Skeleton chase	15 x 22 ⁷ / ₈ "	17 ¹ / ₈ x 21 ¹⁵ / ₁₆ "
between bearers	15 x 22 ³ / ₄ "	17 ¹ / ₈ x 22 ⁷ / ₈ "
Gripper margin	5 ⁵ / ₁₆ to 13 ¹³ / ₃₂ "	5 ⁵ / ₁₆ to 13 ¹³ / ₃₂ "
Net weight	abt. 6,630 lbs	abt. 6,600 lbs
Maximum speed per hour	5,000 sheets	5,000 sheets
Space requirements		
Length x Width		
x Height	8'4" x 4'9" x 4'9"	8'4" x 4'9" x 4'9"
Power requirements	4 kW = 5.5 HP	5 kW = 6.7 HP

	S-line	
Designation	SBG	SBB
Maximum sheet size	22 ¹ / ₂ x 30 ¹ / ₄ "	22 ¹ / ₂ x 32 ¹ / ₄ "
Minimum sheet size	8 ¹ / ₄ x 11"	8 ¹ / ₄ x 11"
Inside measurements		
Standard chase	21 ¹ / ₄ x 28 ³ / ₈ "	x 30 ¹³ / ₃₂ "
Skeleton chase	21 ¹ / ₄ x 29 ¹ / ₈ "	x 31 ³ / ₁₆ "
between bearers	21 ¹ / ₄ x 30 ¹ / ₄ "	21 ¹ / ₄ x 30 ¹ / ₄ "
Gripper margin	5 ⁵ / ₁₆ to 13 ¹³ / ₃₂ "	5 ⁵ / ₁₆ to 13 ¹³ / ₃₂ "
Net weight	abt. 11,180 lbs	abt. 11,850 lbs
Maximum speed per hour	4,600 sheets	4,600 sheets
Space requirements		
Length x Width		
x Height	11'6" x 6'7" x 5'1"	11'6" x 6'7" x 5'1"
Power requirements	6.2 kW = 8.5 HP	6.2 kW = 8.5 HP

Hints for all Jobs on Heidelberg Automatic Cylinders

Accurately levelled and prepared form

The Heidelberg automatic cylinder is a machine incorporating an inking system of sturdy construction. This results in a considerable reduction of makeready time. This advantage, however, cannot be turned to profit unless the printer prepares his form with extreme care and precision. Above all, it is absolutely imperative that the plate should be brought to type height with a tolerance not exceeding one thousandth of an inch. Only in this way can a correct cylinder impression be obtained which allows the cylinder to unroll perfectly on the surface of the form, with absolutely synchronous speeds of both surfaces.

If the form is made up too low, a satisfactory imprint can only be achieved with excessive packing; conversely, a form made up too high may require the number of packing sheets to be reduced. In both cases printing difficulties (see page 47) and tiresome delays in form preparation will result. Accurate forme levelling, on the other hand, greatly facilitates makeready.

Any letterpress printer should know that makeready time on the machine means loss of production, whereas any work done away from the machine ensures better production.

The impression cylinder of the Heidelberg automatic cylinder unrolls, even on the heaviest form, on the bearers of the typebed and does not "bear off", as happens with machines of less strength. Thus, if the form is accurately positioned, all that is required for makeready is the levelling up of uneven areas in the form. Furthermore, with halftones it is, of course, necessary to bring up the different tonal values with mechanical makeready.

Never work from the packing (approx. .048") but always from the accurately made up form. To ensure good overall printing some of the packing sheets should be removed, or added, as the case may be. The packing thickness of .048" indicated here serves for guidance only. This measure includes the thickness of the paper or carton sheet to be printed.

In order to save makeready time from the very beginning, the experienced printer will invariably level up solids, or heavy and large screen forms, up to .002" above type height (instead of

trying to obtain the higher impressional strength necessary through a greater packing thickness). The pull or tension acting on the packing during impression is thereby reduced, and so is the tendency to cause slur or plate wear. It also counteracts any slipping of the packing. If, after several years of operation, it should be necessary to increase the number of packing sheets, we suggest that the cylinder pressure between bearers be checked and adjusted by an engineer from your Heidelberg dealer.

Checking the plate height

Accurate checking of the plate height can only be accomplished with the aid of a good micrometer plate gauge. Today every printshop should own such a gauge.

In countries where printing techniques are less developed, numerous printers are still in the habit of measuring the plate height with unaccurate gauges.

Plate mounting

Plate mounting will highly affect the printing quality. Printing plates nailed to wooden mounts will no longer meet today's requirements, particularly where larger printing plates are involved.

Plates should be mounted on solid metal or, better still, on light metal or honeycomb bases, to achieve the considerable reduction of makeready time offered by the Original Heidelberg cylinder, with its tremendous impressional strength.

Light metal mounting bases are noted for their low weight. A lighter form will, of course, also reduce machine wear. If you have to work with lead bases, these would be cast in a skeleton casting mould.

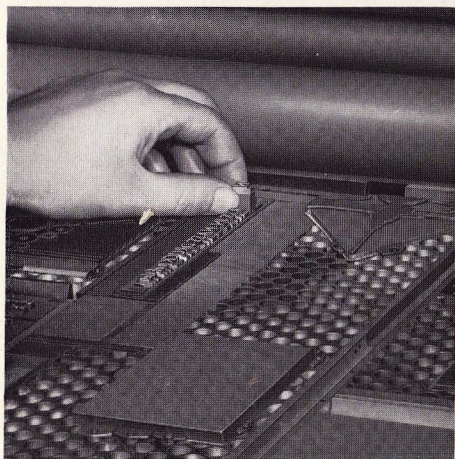
Larger plates must be tight to the base, so that they do not spring in the center. We, therefore, recommend the use, whenever possible, of thin adhesive mounting foils of about .006". This will make the plate adhere safely to the base. Mounts should be obtained from approved suppliers only, because it is most essential

that these be absolutely true and square. It must further be noted that the mounts must be without hollow surfaces, otherwise the plates will not lie perfectly flat, and are liable to spring, with slur resulting.

Honeycomb bases permit simple and safe plate mounting. The base consists of various sections produced with high precision, which can be used to fill up the whole chase.

When mounting is done on honeycomb bases, you should either use plates made to electrotypes thickness, or stick original plates with double-sided adhesive tape of .006" on a zinc or light metal plate of corresponding thickness, in order to obtain electrotypes height. Honeycomb mounts can also be used as base material for mixed forms. Those parts of the form, not consisting of typesetter, and having to accommodate printing plates are filled out with honeycomb sections.

The printing plates are clamped by means of steel hooks so designed that the position of the printing plates can be changed within a range of approx. 16 points. Thus final positioning is considerably facilitated.



Portions of
honeycomb bases
with different
printing plates

Additional safety controls against springing and shifting of plates during printing

We always recommend that printing plates be mounted with two-sided adhesive. Then the printing plate will lie perfectly flat all over and cannot spring. If the printer fails to do a proper job, or if particularly unfavorable conditions prevail, it may happen that the plate will shift. This can, however, be seen mainly with smaller plates. Quite often the real cause of the ensuing register differences is not recognized and the fault is believed to lie with the machine.

Plate shifting is, in practically all cases, due to one of the four following reasons:

1.

In tropical countries or in hot weather, double-sided adhesive foil becomes somewhat spongy and soft which may account for a slight shifting of the plate.

2.

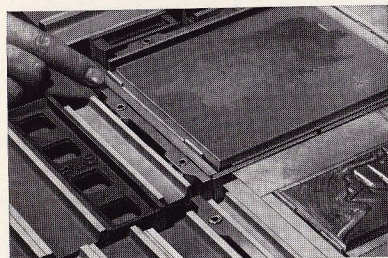
If the rolling action of the impression cylinder is out of gear, i. e. if the circumferential speed of the cylinder packing surface and that of the form are not perfectly synchronized, the printing plate is liable to shift. This is mainly due to a badly levelled-up form or excessively heavy, or weak, packing.

3.

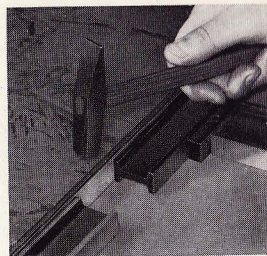
Due to excessive cylinder pressure which is easily recognized by the extremely dark shading at the back of the imprint, drifting may occur which may be another cause of plate movement.

4.

If too much form or roller cleaning solvent is used, the adhesive foil dissolves and so loses its adhesive power. In such cases the correct position of the printing plate is no longer ensured (see page 50).



1



2

Plate drifting can easily be remedied with the aid of two 6-point rules, which are positioned along the back edge of the printing plate (the width being equal to the height here), and locked up in the chase. The empty spaces are filled out with furniture and spacing material. Seeing that these rules are lower than type height (.918") they are not inked. Nevertheless, both these rules are high enough to serve as a stop to the printing plate. Illustration 1 shows such a form. Clearly visible are the two brass rules stopping the plate from drifting.

The printing plate may also be additionally fastened by means of some nails (illustration No. 2). Below the nailing spots there are systematic wooden mounting bases.

The plates are, occasionally, mounted on lead: They are, at first, stuck on to the base and subsequently fastened with steel nails. To prevent the lead from bellying at the nailing spots, the tips of the nails are pinched off, or the nail holes are drilled beforehand. To eliminate any springing or shifting of the plates during printing, it is essential that all work should be most accurately done, with a correctly made up form and the right packing thickness. Only in this way is a perfect "unrolling" action guaranteed.

Feed adjustments and register control

In the following chapters (Pages 16 to 19) we are going to deal with feed adjustments, because this preparatory work will consid-

rably influence the printing quality. The diagrams on pages 20 (S-line) and 21 (K-line) will explain this.

If differences in register are observed, the printer will normally check the register guides first, because it is there that jumping or kinking of the sheets generally occurs. Apart from this there can be other causes leading to faulty register right from the beginning of the sheet's passage. Unfavorable paper storage conditions may cause warping of the sheets. Frequently, static electricity or wavy packing is responsible for misalignment of the sheet by the front and side lays. Moreover, unless the feed board lays the sheet down smoothly, it may prevent uniform alignment. It can also happen that the board surface is roughened by the use of very coarse anti-offset spray. Therefore, to ensure flawless register, regular cleaning of the board should not be neglected.

Furthermore, the pressmen should see to it that the sheet steadier presses the sheets on the paper table firmly against the front bars, otherwise you cannot be sure that the sheets will be safely taken up by the feed board grippers and transferred to the front lays.

Side lay guide adjustment

The side lays are laterally adjusted to a scale on the side lay shaft. The side lay to be used for the job is simply set to the same number as the scale on the feed pile table aligned with the side standard.

The sheet, after having been transferred to the front lays by the feed board grippers in the feed table, should be moved to the side by $\frac{5}{32}$ " to $\frac{3}{16}$ ", though at higher speeds the movement should not exceed $\frac{1}{8}$ ".

In registering the sheet, the side lays can be adjusted by the micro-precision regulating device (see page 18), or through a slight lateral adjustment to the side standards of the feed table.

The side lay is provided with a cover plate, adjustable in height to the thickness of the stock to be run. The cover plate prevents the sheet from curling up. The cover plate height should be set

so that not more than two sheets of the stock to be printed can be slipped under it. The side lays and the cover plates, after registering the sheet, are lifted, to prevent the sheet from crowding.

Moreover, the side lay is fitted with a micro-adjustment screw. After loosening the lower thumb screw, the micrometer screw can be turned for precise adjustment to a graduated scale. After micro-adjustment, the thumb screw must be retightened. When positioning the plate for a new job, care should be taken that the side lay be set midway of the scale.

Whenever larger sizes are printed on S-line machines, the opposite side lay – not in use – should be completely removed, because the two side lays would otherwise move from outside to inside, in opposite directions, with the result that the sheet would be pushed against the opposite side lay (differences in register!). If large sheet sizes are printed on K-line machines, it is best to set the opposite side lay to the outside, because both side lays move in the same direction.

When printing smaller sizes, the opposite side lay is normally out of way so that the sheet cannot strike it.

When printing the first form, the pressman normally uses the lay gauge on the operator's side (the lay gauge moving from the operator's side to the drive side). This enables him to watch work more conveniently from his operating platform, unless of course, the job requires registering from the drive side. With S-line machines no lever need be shifted for this purpose. With machines of the K-line, however, the pressman should make sure that the lever provided on the drive side, above the flywheel, be set on "Lay gauge – operator's side" (downward).

When the back of a sheet is to be printed, its alignment should be effected by the side lay on the drive side (with the side lay moving from the drive side to the operator's side). Again, because the register guides move in opposite directions, machines of the S-line require no lever shifting, whereas with K-line machines the aforementioned lever should be raised to "Lay gauge – drive side" (top).

Using sheet smoothers

If the stock tends to curl up slightly at the edges, sheet smoothers, as supplied with the machine, should be mounted above the sheet. The sheet smoother, with its bent plate spring, can be inserted directly above the side lay, so the corner of the sheet cannot possibly curl up at the side lay.

Using sheet brakes and brushes

Supplied with the standard equipment of the machine are two brackets with steel bands which are used as sheet brakes on the feed board.

When the machine is running at top speed, there is always the risk of sheets jumping at the front lays, with the resultant differences in register, depending on the quality of the stock. Because of this the sheet brakes should then be used as an additional precaution. They are mounted on the bar carrying the sheet smoothers and the sheet is slowed down at the front lays.

The heavier the paper or carton, the more firmly the sheet brakes should be applied. With a stock of medium thickness the brake should rest just slightly on the paper. For stock of lighter weight no brakes are required as a rule.

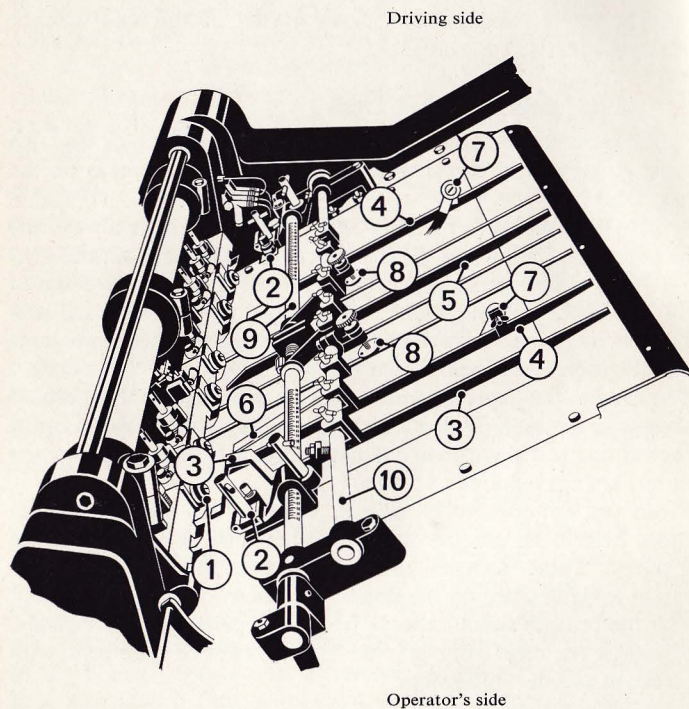
Moreover, for jobs to be printed at very high speeds, it is, at times helpful to use the brake brushes also supplied with the machine. These, fastened to the sheet smoothers, have an additional braking effect on the sheets. It is, however, most important that the brushes should always be used in pairs and never singly, otherwise the sheet will reach the front lays out of alignment, with resultant register differences.

Setting the front lays

With the automatic cylinders of the S-line, the 6 front lays are located at the swinging gripper bar, whereas with the K-line machines they are mounted on a separate bar. They can be adjusted to a gripper margin from $\frac{5}{16}$ " to $\frac{7}{16}$ ".

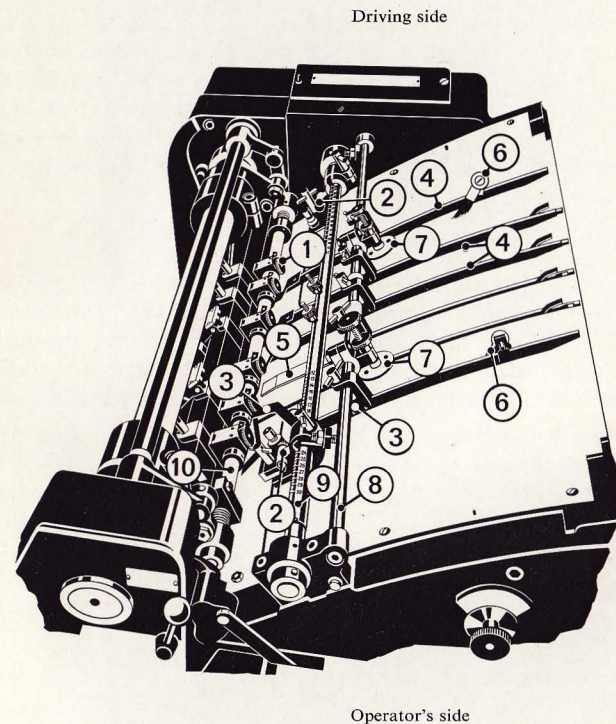
To avoid any tilting of the sheets during feeding, only two front register guides should be used.

Feed table of Original Heidelberg Cylinder, S-line



- ① 6 Front lays ② Side lays ③ Sheet smoothers with bent plate spring ④ Standard sheet smoother ⑤ Lower sheet smoother for onion skin ⑥ Sheet brake ⑦ Brake brushes ⑧ Double-sheet gauge ⑨ Side lay shaft ⑩ Bar carrying sheet smoothers.

Feed table of Original Heidelberg Cylinder, K-line



- ① 6 Front lays ② Side lays ③ Sheet smoothers with bent plate spring ④ Standard sheet smoother ⑤ Sheet brake ⑥ Brake brushes ⑦ Double-sheet gauge ⑧ Bar carrying sheet smoothers ⑨ Side lay shaft ⑩ Front lay bar.

The register guides used are determined by the sheet size at the time the forme is prepared in the chase. Four front lays should be used for the two-up feed only.

When starting a printing job, it is advisable to set the two register guides in use to a mean paper margin of $1\frac{1}{32}$ ", to allow adjustment in either direction, if necessary. The unused front lays should be moved to their lowest position, so that they will not touch the sheet during alignment. When printing thin stock in the maximum size, however, it may at times, be advisable to set the unused front lays at a distance of .004" from the front edge of the sheet, so as to prevent the paper from sagging.

Cylinder brush

The cylinder brush smoothens the sheet on the impression cylinder. It controls the paper and keeps the powder from dropping on to the form. Through a mechanical control the brush is not applied to the cylinder until the front edge of the sheet has moved past the brush. Thus any form of creasing is eliminated.

The brush is operated by engaging a lever near the first form roller, on the operator's side of the machine (S-line: 3 positions, K-line: 2 positions). The brush should definitely be used for register work, also for printing multi-color halftone jobs. For many kinds of jobs it is possible and even necessary to make full use of the brush. It goes without saying that, with multi-color work, the ink should be sufficiently dried before subsequent printing.

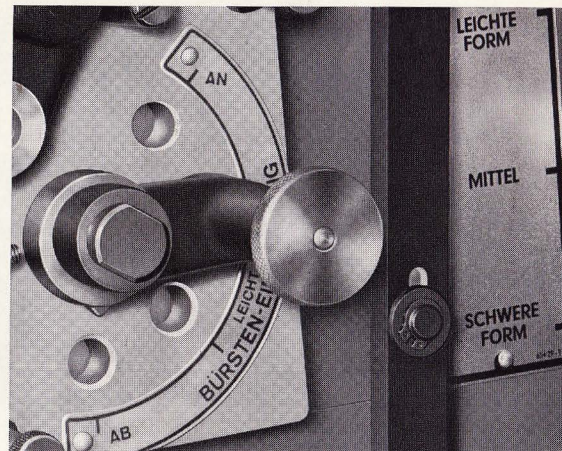
To adjust the brush, proceed as follows:

1.

Advance machine until the 4 feed board grippers have reached their lowest position and are wide open. Switch off power, shift control lever to "impression".

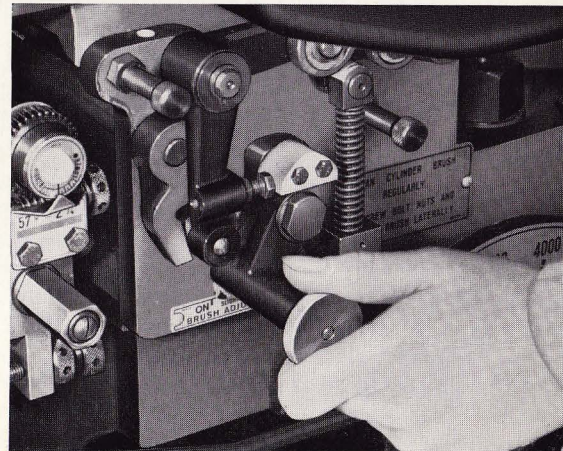
2.

Advance machine by turning flywheel manually, until cylinder grippers have moved past the swinging gripper bar of the cylinder.



OHC of S-line: Index lever for brush position

OHC of K-line: Index lever for brush position



3.

Place two strips of strong paper, of $1\frac{1}{2}$ " to 2" width and 24" to 32" length, of approx. .004" thickness, each into a cylinder gripper, one on the left and one on the right side of the cylinder.

4.

Adjust the brush so that it contacts the cylinder "lightly".

5.

Advance the machine by hand until the cylinder grippers release the two paper strips.

6.

Determine by a slight pull on each of the two strips of paper the pressure of the brush against the cylinder surface. If adjustment is required, regulate by turning screw, outside (S-line) or inside (K-line) until there is a slight tension on paper strips when pulled.

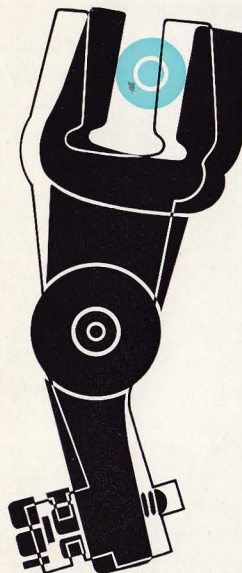
7.

After this check, tighten the regulating screw with the lock nut and remove strips from the machine.

The brush should be checked at regular intervals, considering that the bristles will wear off as they are used. Any brush that does not properly rest against the cylinder, will cause differences in register.

Frequently, the brushes wear more in the middle than at the sides, because not all jobs make full use of the machine width. For this reason the brush should, after a certain time, be adjusted in the portion resting on the center of the cylinder. This should be done before the brush is worn too much.

The bristles have a normal service life of several years. If the bristles are down to about $\frac{1}{8}$ ", the brush, complete with its plate, can be exchanged against a refilled one. This can be done through your Heidelberg dealer who will only charge for refilling the brush.



OHC S-line:
Movement of brush control lever
with adjusting screw



OHC K-line:
Movement of brush control lever
with adjusting screw

To ensure neat and safe operation, it is imperative – when working with the powder-spray device – to clean the brush every day before the machine is started. Before removing the brush, advance the cylinder so that its recessed section faces the brush (with the toothed segments of the cylinder up).

When inserting the cleaned brush, care should be taken that on the operator's side the control roller is seated in the forked bracket.

Sponge rubber, a good protection against smudging

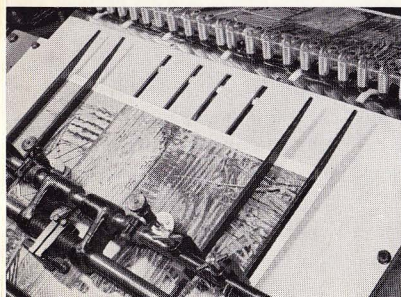
Any normal drying ink requires several hours to dry well enough to enable the sheets to be backed up without difficulty. With short runs, however, quick backing up often becomes necessary with the result that during printing, the ink will frequently "pick up" on the feed table and mark the other side of the job.

Self-sealing sponge rubber offers good protection against this.

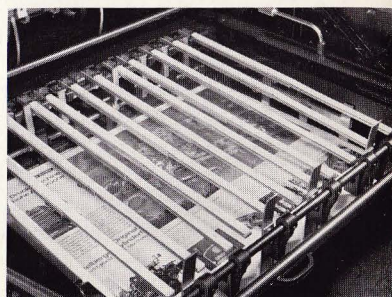
Illustrations 1 and 2 show how to use this material on an automatic cylinder of the S-line. Illustration 1: The sponge rubber is stuck in short strips, along the curved edge of the feed table and, if possible, on print-free areas only.

Illustration 2 shows delivery racks on which sponge rubber strips are stuck. If the strips require cleaning, they should be carefully washed with form cleaning solvents (petrol or other quick drying fluids).

1



2



OHC without automatic impression lever control – Positioning the makeready sheet

Machines without automatic impression lever control are outwardly identified by the protection plate on the operating side to the left of the wording "Original Heidelberg Cylinder" having a rectangular projection. With the OHC equipped with automatic impression lever control, this projection is of circular shape.

The printer, operating the OHC without automatic impression lever control, places by hand the makeready sheet to be printed into the front lays when the feed board grippers are in the lowest position. Thereafter he advances the machine (set on "Run") until the cylinder grippers have reached the bar carrying the sheet guards. There the machine is stopped and the sheet is stabbed. It is well known that stabbing is never done at the front edge, but in the central area of the sheet, because the height of the makeready is lower than during the proof pulling, while the excess length thus obtained must be distributed towards the front and the back.

Subsequently, the machine is at once put on "Impression". The makeready sheet, with the imprint, is then conveyed to the delivery.

OHC with automatic impression lever control – Positioning the makeready sheet

In the process of the ever increasing perfection, all Heidelberg automatic cylinders of the S-line have since the end of 1963, been equipped with the automatic impression lever control (those of the K-line since the middle of 1964). This device combines a still more convenient operation with increased safety. The impression cylinder of this machine (and with the automatic two-color cylinder, the rotary plate cylinder as well) is no longer raised and lowered by the operator. This is now done automatically, by mechanical means. The control lever only serves for transmitting the operator's commands. In cases of misfed sheets the lever no longer returns to "Stop" when the machine stops, but remains

on "Impression" while the impression is actually off. Before the press can be restarted, the impression lever must be returned to the "Stop" position by hand.

When the makeready sheet is to be stabbed, proceed as follows:

- a) S-line: Shift handwheel of speed control to position "1".
K-line: Return crank of variable speed control to "2,500".
- b) Advance machine by control lever to "Run" until the 4 feed board grippers of the feed table have reached their lowest position and are wide open.
- c) Insert makeready sheet into opened feed board grippers and towards the front lays.
- d) Shift control lever rapidly from "Stop" to "Impression". Machine will then be on impression.
- e) As soon as cylinder grippers have reached the bar carrying the sheet guards, return control lever rapidly from "Impression" to "Stop". The machine will then be stopped in a position where the sheet will be easily accessible for stabbing. The cylinder is still on "Impression" although the control lever has been returned to "Stop".

Normally, the impression will be thrown off by the control lever if the lever is returned from "Impression" to "Stop" at the moment the sheet is transferred to the cylinder grippers.
- f) After stabbing, move control lever to "Operation". Since the machine is, as explained above, still on "Impression", the makeready sheet is conveyed, with the imprint, to the delivery. Additional sheets, however, are not picked up and the impression is automatically disengaged.

This process saves time and is easily mastered after some practice.

Cylinder Packing

General

An experienced printer understands there is no standard packing suitable for every kind of job. In practice, the semi-hard packing (with printing blanket), and hard packing (without printing blanket) have shown good results.

The total thickness of the packing should, according to the compositions enumerated below, and with the overlay sheet, be maintained at about .048". For measuring the thickness of the packing, a packing gauge, as supplied with the machine, or a micrometer or a micrometer plate gauge should be used. Always bear in mind, however, that it is not the thickness of the packing that is of primary importance. It is essential that the form be brought up to the correct type height (see page 13).

Only with carefully selected, good quality paper and board can a taut packing of uniform thickness be obtained. The packing sheets should be folded over at right angles, about 1" away from the paper edge, to be held in the packing clamp. It is however, not absolutely necessary that the sheets which are to be removed after the makeready has been pasted on, be clamped tight. Packing sheets should, for better distinction, be of colored paper. In our list of packing compositions we recommend, as carton material, the use of ivory-finished cardboard, because it is normally available in uniform thickness; boards of irregular thickness require a lot of time for makeready. Moreover, the makeready sheet should be pasted on manila tympan which, with its smooth surface, has no tendency to shift after the makeready has been pasted as would happen with coarser paper.

Stock of top sheets

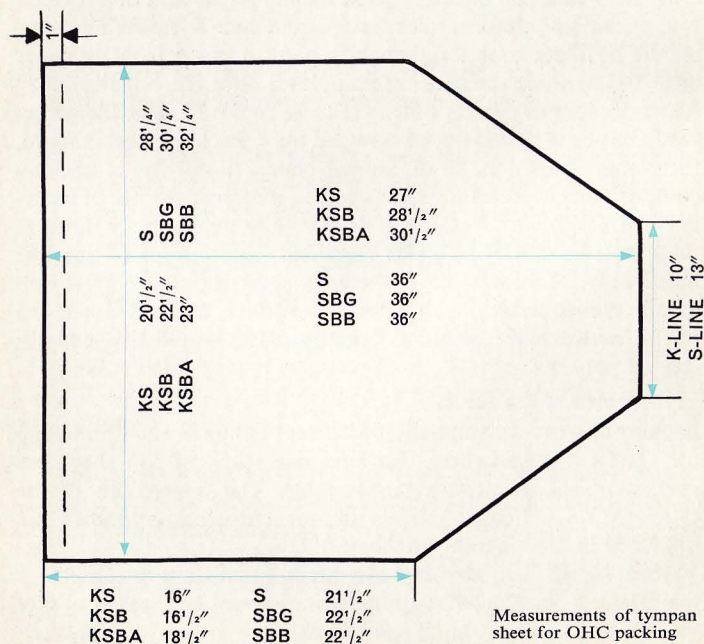
Packing sheets cut to size should be kept handy in each printshop for OHCs installed there. An adequate stock of top sheets, in particular, should always be available. The dimensions of the tympan for different models of our automatic cylinders are indicated in the diagram on the next page.

Various paper manufacturers are offering ready-cut top sheets for the OHC. Your Heidelberg representative will be pleased to give you the addresses of suitable suppliers.

Semi-hard packing

It is used for plate formes and formes mixed with plates and type matter.

- ① Top tympan (top sheet) stretched taut
- ② 1 Manila hangar, secured at front clamp
- ③ 1 Heidelberg printing blanket, of .012" thickness, secured at front clamp
- ④ 4 to 5 fill-ins, each approx. .0025", colored, secured at front bar
- ⑤ 2 packing sheets, each approx. .0025", colored, to be removed after the makeready is pasted on



- ⑥ 1 tympan, secured at front bar, to carry the levelling up makeready, if necessary, and finally the mechanical overlay (see pages 105 and following).
- ⑦ 1 ivory-finished cardboard of about .008" thickness, secured at front bar

Hard Packing

For straight type matter, ruled forms, and fine line engravings.

- ① Top tympan (top sheet) stretched taut
- ② 1 tympan, secured at front clamp
- ③ 5 to 6 filler sheets, each approx. .0025", colored, secured at front clamp
- ④ 2 packing sheets, each approx. .0025", colored, to be removed after pasting on makeready
- ⑤ 1 tympan, secured at front clamp, to carry the makeready
- ⑥ 2 ivory-finished cardboards, total thickness approx. .016", secured at front clamp

Packing

A semi-hard packing is generally used (see page 30).

Form rollers

For high-quality halftone printing all 4 form rollers should be used. Thus perfect ink covering is achieved and frequent form wash-out is unnecessary.

Paper

In halftone printing best results are obtained on coated art paper, the quality of which should be elastic and not too hard. As compared with coated art stock, machine finished stock is less expensive, with the result that it is increasingly used for process color work. It is essential, however, that the ink should match the quality of machine finished papers. So consult your ink supplier. Recently, papers have been offered, the quality of which lies somewhere between coated art stock and machine finished stock. They can be used for letterpress and offset jobs. Before choosing the direction of the grain, it will be advisable also to consult the bindery in view of further processing to be done.

Printers producing good quality work, would be advised to instal air humidifiers. A relative humidity between 60 and 65 % gives the best working conditions (see page 112). Serious fluctuations in humidity lead to register differences and irregular production. Efficient and low-priced air humidifiers can now be obtained.

The ink

The use of inferior inks for high quality halftone printing will result in the finished job lacking that final touch of brilliance. Not even the very best machine can make up for inferior quality inks. Good halftone ink, rich in pigment, is a must for perfect printing results. Where large dark areas and black solids are involved, the inks should be wear-resistant and varnish-proof, particularly if it is intended to have them varnished or laminated later.

Anti-offset spraying

When producing halftone work it will normally be necessary to use a spray gun to prevent the sheets from off-setting. The amount of spray used should be as little as possible, so as not to impair the smoothness and brilliance of the printing.

Packing

Always use a semi-hard packing (see page 30).

Form rollers

Multi-color jobs are normally printed with 4 form rollers. The superb inking of the Original Heidelberg Cylinders is just what is needed for exacting four-color jobs and leaves nothing to be desired.

The paper

The best results in process color printing are obtained on highly coated art paper. As the stock tends to change its texture across the direction of the grain, it is advisable to specify the grain direction when ordering paper. As a rule, the printer will order paper with the grain running parallel to the cylinder axis. However, the printer should also consider the further processing of the stock (folding, binding, stitching, etc.). Consultation with the bindery can save a lot of trouble. The paper should be well seasoned so that the sheets will not shrink during the run and cause register differences. If the temperature and the humidity in the stock room are not the same as in the pressroom, it is advisable to store the stock in the pressroom a few days before starting the production run.

Color sequence

Modern printing inks are noted for their high degree of transparency, enabling the printer to select any color sequence he may think the most suitable.

Either of the color sequences described below are suitable:

1. Blue – yellow – red – black
2. Black – yellow – red – blue

In the German DIN specifications the sequence black – yellow – red – blue is stated. This specification, however, should by no means be considered as a general rule or even as a regulation to be

followed. When producing four-color work, black is often used as the first working, with the “colored” inks printed thereafter, in succession. This will facilitate the printer’s work in that he need not position the black form by means of a six-point lock up. Thus final positioning is simplified. Moreover, printing troubles caused by work-ups are reduced. It is another advantage of the color sequence black – yellow – red – blue that, with the last printing, blue can be used to correct any color discrepancies. Depending on the effect of the combined printing of black, yellow and red, a reddish blue, or a blue of a greenish hue, may be used for finally adjusting the results to the original.

The color sequence black – yellow – red – blue was originally determined by the working methods of the platemaker who, on reproducing four-color illustrations, would make a black copy first, and subsequently inserted the three “colored” inks yellow, red and blue in such a manner that the black image was colored, as it were. The secondary color black was thus preferred as the marking ink or the main ink, with the colored inks being used to bring about the general impression of a colored illustration.

According to the latest concept, black should, with four-color printing, simply serve for emphasizing the details, while the colored inks, due to their transparent properties and their intensity are to set off all the color effects of the original to advantage with all the sharpness needed. For this reason blue, not black, is generally preferred as the first color nowadays, because it mostly dominates with an even tone throughout the run and, with the following colors yellow and red, an almost finished color impression is obtained. Black, as the last color, will finally be used to emphasize the details, to accentuate the neutral shades and to put more contrast into the illustration as a whole.

Very little is made of the possibility of printing yellow as the first color in four-color jobs, because for purely optical reasons it is hard to maintain the yellow ink supply uniformly throughout the run. Since, on the other hand, yellow inks are highly transparent nowadays, they can be worked as the second color without any risk.

Summarizing, it can be said that in dry four-color printing (not wet-on-wet) the color sequences mentioned have shown good results. With illustration printing, blue – yellow – red – black can be used to advantage because of the very brilliant imprints, whereas for multi-color, mixed forms black – yellow – red – blue may be found more suitable.

Color scale

On selecting his colors the printer is in general guided by the progressive proofs of the platemaker who, as a rule, can choose between two scales:

1. standard scale to German DIN Standard 16,508, known as the cold scale,
2. a warm scale, as used, for example, for reproductions with KODAK material.

Although the sample books of various ink suppliers offer further possibilities, it is advisable, for the sake of simplicity in operation, to work with two scales only, provided these fully meet the requirements of the majority of four-color jobs.

The DIN scale offers the advantage that with it a very wide range of colors, i.e. a very great number of shades can be obtained and that, within the violet range in particular, clear and bright shades are to be had. The warmer scale, on the other hand, makes available, within the range of the blue and red color, particularly strong color effects and as a result is given preference wherever there are suitable motifs. Practically all color reproductions are nowadays made from transparencies, and practical experience has shown that, with the cold and the warm scales mentioned, full justice is done to the color effects and the color range provided by those films.

Printing of progressive proofs

For process printing it is always advisable to ask the photoengraver to prepare progressive proofs on the paper quality to be used for the run. Should the printer, later on, decide to use

another paper quality, tonal changes are bound to occur which will adversely affect true reproduction printing.

Thus the printer operates, as a rule, according to a tonal scale of progressive proofs available. If he does not know the inks used for printing these proofs, he must select the corresponding shades from the sample book of his ink suppliers. In doing so, he should bear in mind that one and the same ink, printed on various paper qualities, will produce different color tones.

If full color proofs are not available, the printer should, before starting the run, prepare progressive proofs with the material to be used. This will enable him to compare the various tones reliably and accurately before the run is started. If need be, the printer may look, in his collection of sample proofs, for a progressive scale which will resemble, in its tonal effects, the job to be done. This will enable him to be guided by the tonal scale of a similar job.

Ink transfer during production runs

One of the main advantages offered by letterpress printing is uniform ink transfer throughout the run. It should, however, be noted that printing inks are most sensitive to temperature changes. During running in, the temperature in the ink fountain will be lower than during a long production run. The continuously rotating steel cylinders and rubber rollers will cause the ink to warm up, which will alter the printing properties. Inks which, at the start, are rather stiff (excepting those tending to pick) will allow a good ink transfer and produce dot-sharp printing. When inks become thinner during the run, this may reduce dot-sharpness and the uniformity of the ink transfer.

It is, therefore, necessary to carefully control the ink transfer during production printing, and, to adjust the width of the ink stripe on the fountain roller, in accordance with the printing results obtained. Under very unfavorable temperature conditions it is advisable to use a minimum amount of ink in the fountain and replace it with fresh ink more frequently.

Printing properties of inks

Many of the problems the process printer is faced with have something to do with paper and ink qualities. Modern printing inks are far superior to inks used in former years, as far as their performance and richness in pigments are concerned. This is, no doubt, the result of the so-called "flushing process" which, while fully preserving the color pigments, enables the ink manufacturers to produce colored and black inks with a maximum consistency, concentration and purity. They allow minimum ink and provide, at the same time, quite a number of additional advantages, such as reduced time between printing, perfect ink adhesion in solids, dot-sharp printing of the screen areas, rapid drying.

Consequently, no printer is nowadays obliged to print with excessive ink. On the contrary, with normal to minimum ink he obtains the best results, rich in contrast and of high brilliance.

Brightness and gloss can be intensified by subsequent overprinting on the OHC with gloss varnish, or with the aid of spirit varnish or the laminating process. Inks to be overprinted with spirit varnish or nitro-cellulose must be resistant to these properties. This is not necessary when high gloss inks are used. With cast coated materials as supplied by various wellknown paper mills, and with inks formulated on a plastic base, a very excellent gloss effect is obtained. The same applies also to process printing of large solids. These papers can, in many cases, save one printing operation.

When using special gloss inks, care should be taken that the printing operations follow in rapid succession, otherwise the next color might not be readily taken. It is also possible to use only one high-gloss ink as the last color, in order to obtain a degree of brilliance.

Using the spray apparatus

In process printing it is necessary to use the spraying apparatus, though a very small quantity of powder will normally do for most

of the runs. This is important, for the taking of the next color and the behaviour of the printed sheet during varnishing and, above all, during the laminating operation. Heidelberg cylinders are equipped with the powder spray apparatus, those of the S-line can in addition be supplied with liquid spray as an optional extra. The spray-nozzles can be precisely adjusted.

If production runs are produced with normal ink transfer, the sheets can, without any difficulty, be delivered to form a pile. The pile height depends, of course, on the weight of color, on the ink absorbing capacity of the stock, and, on prevailing climatic conditions. Short lift delivery boards, supported by small wooden blocks, are inserted between the different piles until the whole delivery pile can be wheeled away. The piles should be covered with 20 to 30 waste sheets to prevent the top sheets from buckling.

Picking of inks and sticking of printed sheets will not occur if due consideration is given to all these snags, and the piles are properly checked while the inks are setting. We recommend numbering the individual piles. If, for instance, the form must be unlocked during the run, because of works-ups or damaged plates, it will also be advisable to mark the pile involved, so that when printing the following color the register can easily be rechecked and adjusted, if necessary.

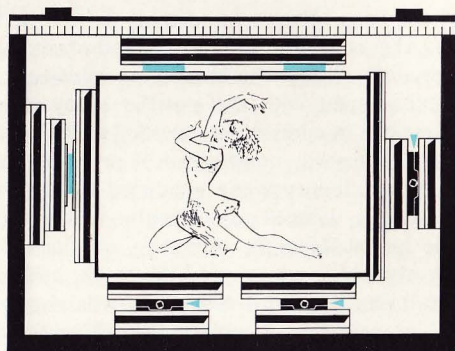
Printing aids

As a rule, inks for multi-color printing are now supplied for use straight from the can. If difficulties are experienced during the run because, for instance, the ink is not suited to the stock, printing aids can be used for correcting the consistency of the ink (for shortening the ink), or for speeding up the drying process (by the addition of a drying medium).

The ink manufacturers supply effective and carefully selected printing aids both for the correction of the ink consistency and for improving the drying qualities. These agents should, however, be added in minimum percentages and in strict accordance with the recommendations of the suppliers.

Squares or
mechanical six-point
lock-up

Keys and quoins



Six-point lockup

For positioning the plates away from the press, the Heidelberg form pre-registering device is available (see page 59). The plates of the whole process set are positioned by means of a six-point lockup (see illustration). This procedure is absolutely necessary to ensure proper positioning. As is well known, the register is adjusted to the prominent areas of the illustration rather than to the plate edges.

Printing of Mixed Forms

Packing

Always use a semi-hard packing (see page 30). If typematter and rules predominate in the form, with only a few small halftone plates and solids, we recommend that 2 or 3 packing sheets be removed from under the Heidelberg rubber blanket.

Form rollers

In many cases it will do to use 3 form rollers only. The last roller can be removed from the machine.

Stock and ink

For coated art paper we recommend high gloss printing inks, while for machine coated stock process inks should be used which are normally formulated on a plastic base. Also here, close cooperation with the ink manufacturer will be advisable. The ink supplier should, with the order, be given a sample or a description of the paper to be used for the run.

Packing

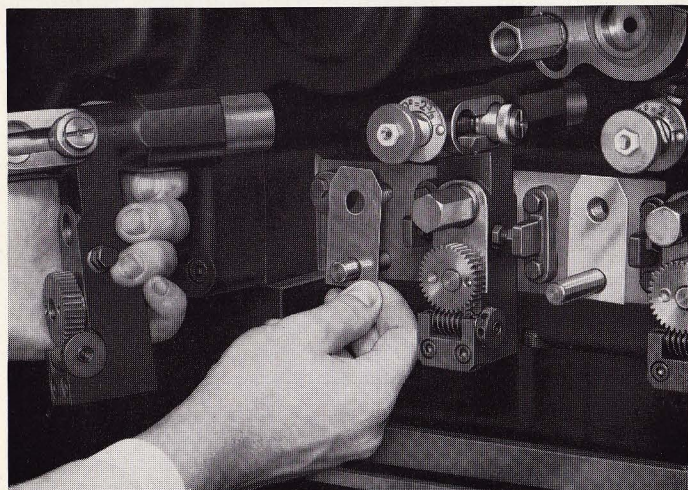
Always use a semi-hard packing (see page 30).

Form rollers

When printing solids, all form rollers should, of course, be used. Four different diameters of the form rollers will help to overcome even difficult ghosting problems.

During the printing of full solids and screened areas ghost marks may appear in the print, particularly where rules or bold text lines precede the solids or are placed below them. The form rollers transfer ink to the rules or lines, with the result that during the "unrolling", areas lacking in ink are transferred from the rollers to the solid. In most cases, though, the fourth form roller will achieve an even inking of the form even with difficult color tones, without the need of resorting to printing aids.

Ghosting can also be counteracted by a stronger lateral ink distribution, which will be further increased by the oscillation of



the form rollers. This is effected by inserting, on the operators side, a metal plate of about $\frac{1}{8}$ " thick between form roller bearing and side frame of the inking mechanism (see illustration on page 42). This will shift the bearing outside, with the result that the roller has some additional lateral movement. Through the oscillation of the distribution roller the form roller will move to and fro and so blot out any repeat marks of rules or of text lines in the solid. This hint should, however, be used only in very exceptional cases, with the thickness of the metal plate never exceeding $\frac{1}{8}$ ".

Another remedy against repeat marks is the shortening of the ink. Most ink suppliers have formulated "shortening" additives for this purpose. If need be, magnesia powder or rice starch will also do.

To give the ink a still better coverage and to eliminate repeat and ghosting marks, zinc white can also be added. Though these additives should only be used if you cannot use the ink straight from the can.

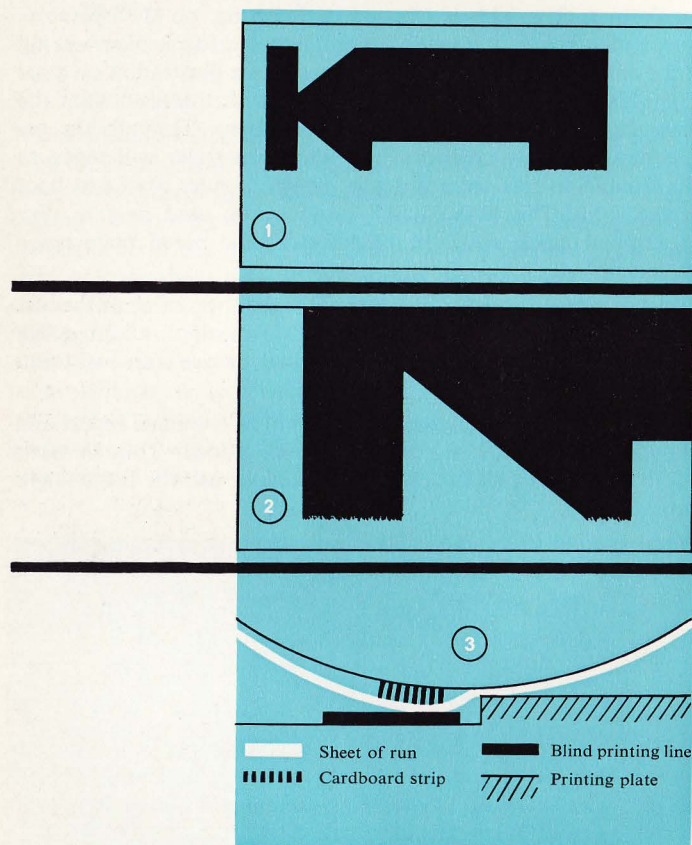
When mixing colors yourself, avoid using a secondary white. Start from a zinc white base, since zinc white is richer in pigment and is better suited to overcoming problems.

Blind printing line

Solids tend to smear towards the leaving edge of the print, even when the plates are precisely adjusted and positioned, particularly when the ink is too tacky or gloss inks are used. This type of slur is not caused by the form rollers.

Illustration 1 (next page) shows the diagram of a printing form with heavy solids.

Illustration 2 shows an enlarged view of the leaving edge of the print. The only remedy for this is the use of spacing material as a blind line which will hold the sheet beyond the tail end of the solid, without being inked.



Directly at the tail end, spacing material of approx. 2 picas in width is locked up. The spacing material should, of course, be below type height, so that it is not inked. It will suffice to be about .020" below type height. At the same position on the packing, a cardboard strip is stuck on, to ensure that the sheet is

held tight with normal pressure beyond the tail end of the plate(s). Illustration 3 shows, overemphasized, a schematic diagram of the end of a plate, with a blind line locked behind it. It is important that the distance to the edge of the illustration should not be less than $\frac{3}{8}$ ", otherwise the bending of the sheet may result in new smearing. For thicker stocks, the distance might have to be increased a little.

Removal of dust and paper fluff during production runs

Paper fluff settling on the form impedes smooth production printing particularly of solids and illustrations. This problem is also experienced when too much spray is used. It is advisable to include at least one form roller with a plastic covering known under the trade name of "Artex", for example. Due to its special tackiness, this roller will remove dust particles and paper fluff from the form. Should one Artex roller prove inadequate, two such rollers can be put on the machine. If Artex rollers are adjusted too low, stronger friction will occur and result in excessive heating of the rollers. This may, under adverse conditions, seriously damage the machine. Artex rollers should, therefore, be most carefully set.

Printing of Type Matter and Rule Forms

Packing

Forms made up of type matter and rules, also those consisting mainly of fine line engravings, require a hard packing (see page 31).

Form rollers

Type matter and rule formes can be printed with 3 form rollers, without difficulty. With rule forms, 2 form rollers will generally do. It is left to the printer whether the first and second rollers (as viewed from the cylinder) are to be used, or the second and third rollers, so that one roller each contacts an oscillating steel cylinder. It is, in any case, a "must" that the form rollers are precisely set to type height; if they are below type height, the rollers are liable to be damaged by the rules.

Makeready

Delicate fine line engravings should if possible be .002" below type height. This will allow the levelling up of the heavier areas. With fine line or dotted rule the make-ready sheet should be cut away to relieve the heavy areas.

Stock

Tabular forms are frequently printed on light weight stock. In such cases the grain of the paper should run perpendicular to the cylinder axis, so that the sheet is stiffened as much as possible. Difficulties in feeding can be overcome by applying talcum powder to the feed board. Attention should also be paid to the proper setting of the front lays (see page 19).

Overcoming Slur

General

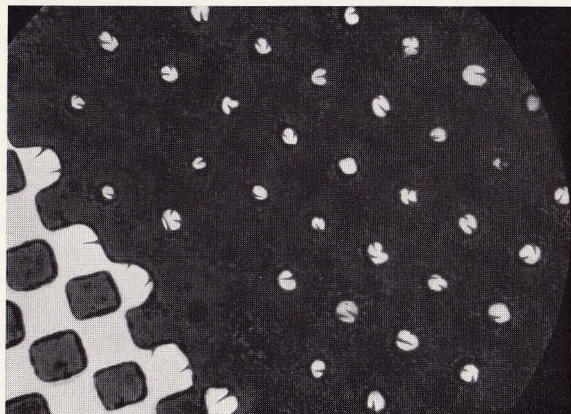
Slur is a problem that can be very annoying to the printer. It is indicated by a blurred appearance of the print. Slur will invariably destroy type matter and plates. Slur can be caused by many things, such as, too thin an ink, ink being too long, form rollers, or slur caused by the printing plates being too high or low. The different kinds of slur are not confined to any one type of machine. With precision built presses, however, slur problems are far less frequent than with obsolete ones provided, of course, the press is run with a well prepared form.

There are favorably priced pocket microscopes on the market, giving magnifications of 50 × or 60 × which are absolutely indispensable in the modern printer's equipment. With the pocket microscope, a slur can be detected in the first pull.

Before dealing with the most common varieties of slur, let us emphasize that oil on the bearers may contribute a lot to slur. Particular care should, therefore, be taken that the bearers are kept absolutely dry and clean.

Slur - ink too thin

Slur caused by too thin an ink is generally detected by the filling-in of the type face and spaces between the screen dots, also by ghosting of the rules. This kind of slur is usually caused by a thin-bodied ink, the use of too much ink with insufficient impression, or by inadequate packing. With screened halftone plates it is more easily detected in the mid-tones, because the spaces between the dots are comparatively small and fill in easily. The slur is not so prominent in deep etched halftones. In color work, on stock with a smooth surface, a slur can even make the spaces between the dots darker in tone than the dots themselves. This kind of slur is not so apparent on stock having a rough surface. When the slur first appears, the ink forms small hair lines in the screen spaces. To overcome this kind of slur, reduce ink flow, use an ink richer in pigment and shorten the ink as much as possible.



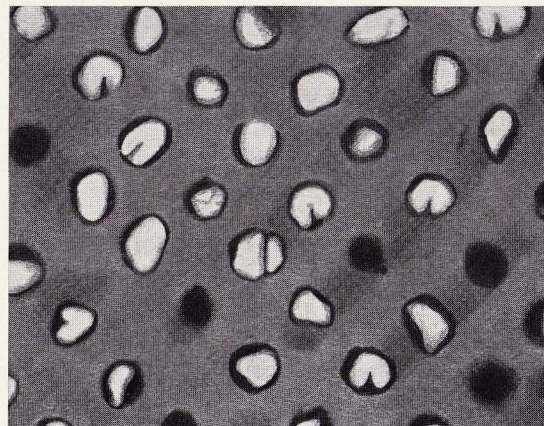
Slur caused by
too much ink

Slur caused by ink being too long

This slur is predominant with large solids or fine screen, and can often be traced to the ink being too long or tacky. It is detected by an uneven strip of ink which runs in a curve approx. $\frac{3}{8}$ to $1\frac{1}{4}$ " wide from the leaving edge of the sheet. The edges of the slur are blurred. This kind of slur is caused by unsuitable ink composition: the ink is too long and tacky and must, therefore, be shortened. By "short" or "long" ink it means that the ink, when lifted up with an ink knife, separates easily, or under the same test can be drawn out without breaking. In no case should tacky, secondary or transparent white be added during the mixing process. The addition of paste will, in many cases, help to improve the printing quality.

Roller slur

While the slur just described appears on the leaving edge of the sheet, roller slur can be seen in the form of streaks anywhere on the printed sheet. Roller slur is generally caused by rollers set too low or unevenly adjusted and can appear as a smudge on each side



Slur caused by
form rollers

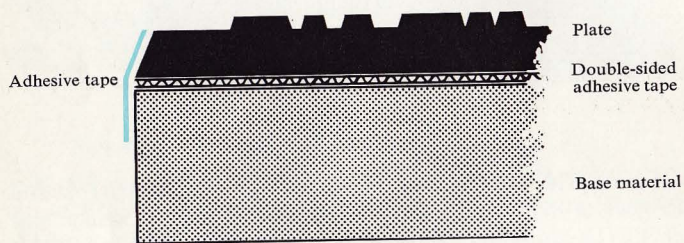
of a plate. The edges of a type page are blurred, and the first and last lines of the page appear in a washed-out grey. A similar slur can also be caused by the rollers not being perfectly round. If this is the case, the slur will appear wherever the uneven part of the roller contacts the form. Moreover, roller slur may also be caused by rollers slipping over the form, as they may do should they become too hard. In such a case streaks appear and the entire impression looks blotchy. We would here refer to the paragraph on "Rubber Rollers, their Care and Treatment" on page 99.

Slur on plates

This slur will appear if plate mounts are not absolutely accurate. Too much interlay may also cause the plates to spring. Again too hard a packing will cause slur on plates. Quite often it is confined to a few spots of the form, if the latter is made up of several single plates only. This slur is recognized by the dot printing much darker, because it is blurred.

Slur can also be caused by the use of washing-up fluids containing a high proportion of non-volatile constituents.

When adhesive foil is used for plate mounting, it may happen that during wash-ups the liquid will penetrate at the plate edges, resulting in the foil losing its adhesion. By fixing "cellophane tape" on the plate and mount edges as shown in the schematic diagram, the fluid will not attack the foil, or the plate edges can be sealed with a lacquer which when hardened, forms a film serving the same purpose. On pages 15/16 we have named two simple remedies designed to overcome slur caused by plates.



Closing the sealing gap between plate and plate mounting

Slur caused by sheet slipping

This kind of slur generally appears in the front section of the printing form if the sheet is not kept taut until impression starts. This will happen when the brush is too loosely adjusted or excessively worn. Brush wear can, to a certain degree, be counteracted by the readjustment of the set screw of the brush holder. For correct brush adjustment please consult pages 22–24.

Paper creasing or bulging

When printing border rules of folders, mourning stationery and similar jobs, with cut-out solids, or rules printed right up to the paper margin, it may happen that crease marks are formed in a

longitudinal direction throughout the printed sheet. This trouble is not, as might be expected, caused by trapped air, but by the paper being gathered within the printed area. This problem may be caused by wavy or distorted stock, wavy packing, bulging makeready with excessively worn type and rules, wrongly adjusted or heavily worn brushes, or by the bulging of full-size thin stock, with the grain of the paper running in the wrong direction.

Here are some of the remedies:

1.

Always use a hard and taut packing. A soft, spongy packing, on the other hand, will increase the tendency of the sheets to bulge.

2.

Where ever possible the paper grain should run parallel to the cylinder axis, so as to counteract warping of the stock.

3.

Adjust cylinder brush as precisely as possible.

4.

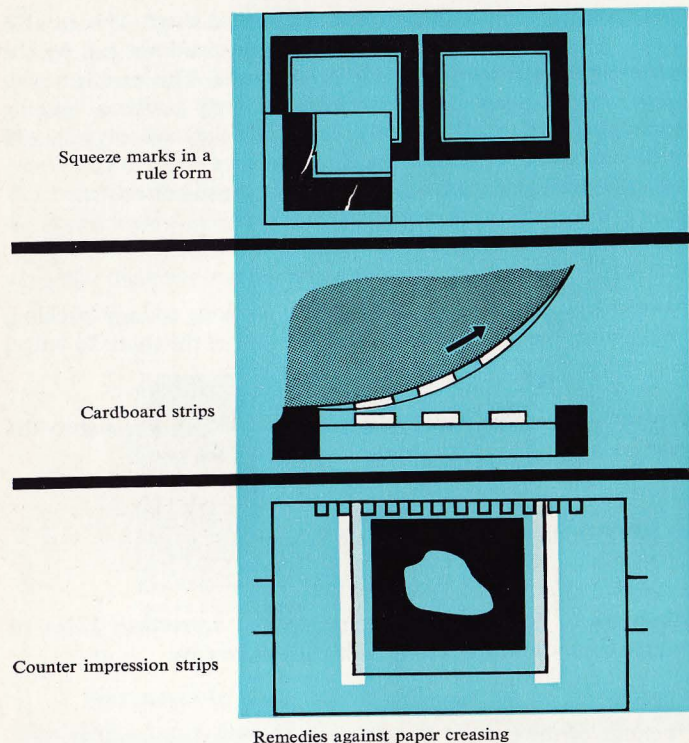
When using hollow mounting material it sometimes helps to reverse the mounts that come within the plate area.

5.

On some of the cut-out areas, counter impression strips of cork, rubber, or foam rubber may be stuck. These strips will ensure that the sheet is kept taut in the print-free areas, and eliminate any distortion. The counter impression strips should be below type height to avoid inking. (Cardboard strips of adequate thickness to be stuck opposite packing areas [see illustration next page].)

6.

Two cardboard strips (see illustration) stuck at the gripper edge and positioned within the sheet edges could be useful in obstinate cases.



7.

Sometimes creasing of thin stock is increased by excessive pressure of the automatic throw-off control rods. In such cases the printer can use light stock counter weights which will allow him to regulate the contact pressure with utmost precision. These counter weights are available as an extra accessory.

Slur caused by high or low plates

Is the type of slur most frequently experienced. It is generally caused by improper form adjustment. If the printing plates are

not made up to exact type height, the printing surface of the plates is not on the level of the "unrolling" height with the result that the screen dots will appear wiped at the tail end of the plate, either in the direction towards the starting edge or the leaving edge of the print.

Because of inadequate means frequently used for measuring the height of the plates, the printer often is unaware that the form is incorrectly adjusted. This leads to time-consuming problems which are, all too often, thought to be mechanical.

If the printer understands the cause of this kind of slur the remedy is simple enough. There may be two causes: either the plate is made up too low and the packing is, consequently, too heavy, or the level of the plate is too high, with too light a packing. In both cases the unrolling speed of the sheet on the impression cylinder does not synchronize with the speed of the type bed.

Tendency to slur is more easily recognized in the lighter shades of a half tone where the dot is isolated. Slur can also be recognized in the deeper shades of a half tone when the "white" circle appears flat on one side instead of perfectly round. If the printer discovers a wiping of screen dots towards the leaving edge, the plates should be made up higher, while the cylinder packing should be reduced accordingly. If, conversely, the screen dots are slurred towards the starting edge, the height of the plates should be reduced and the packing increased.

In illustrations 1 and 2 (next page), comparatively heavy slur is shown, in order to make out the direction of the slur more easily. Before the run is started, the screen dots should be as clearly discernible as in illustration 3, i.e. they should show no tendency to slur in either direction. Unless this is done, long runs cannot be printed free from trouble. Any slur in its initial stages can, however, only be detected with a microscope giving a magnification of approx 50 x. Always see to it that the plate is firmly fixed to its mount.

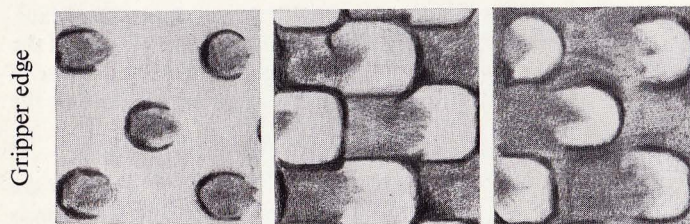


Illustration 1:

Plate is too low: — Packing too thick. If the plate was made up too low and the packing is increased, the surface of the sheet moves fractionally faster than the form. Here the printing strip contacting the form is actually farther away from the centers of the cylinder than with a normally packed cylinder. As a result, the screen dot of the plate is slurred towards the tail edge of the sheet.

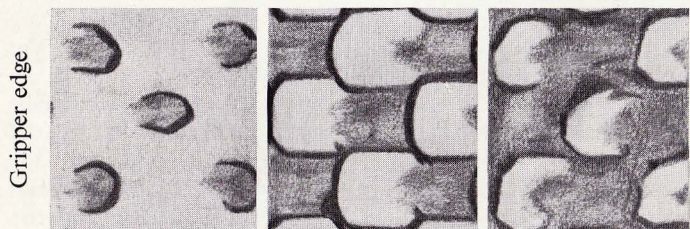


Illustration 2:

Plate is too high: — Cylinder is underpacked. If the plate is too high, the cylinder packing would have to be reduced in order to achieve overall printing. The surface of the sheet moves at a lower speed than the form. The screen dot is slurred towards the starting edge of the sheet.

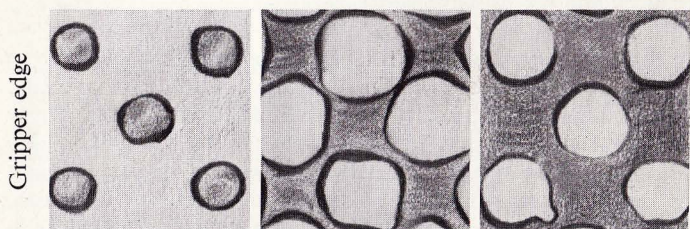


Illustration 3:

Plate height is correct. If the plate is accurately made up, the screen dot is sharp and is not slurred towards the starting or the tail edge of the sheet.

Printing Thin Stock

Which adjustments are to be made?

The printing of thin stock requires very careful machine adjustments. The grain direction should, if possible, run at right angle to the cylinder axis.

1.

The clearance between the sucker bar and the pile should be $\frac{3}{8}$ " to $\frac{1}{2}$ ".

2.

Sucker bar tilt: As a rule use plenty of tilt, though there are some onion skin papers which can be run better without any tilt.

3.

Paper feed: Put paper feed indicator on or near "thin paper" setting.

4.

Paper separation: Place red slides on suckers. Put front separator springs as far out as possible. Adjust side separator springs in such a way that they extend by $\frac{1}{8}$ " to $\frac{3}{16}$ " past the edge of the pile. Tesamoll strips, pasted on the front separator springs, will often assist sheet separation.

5.

Feed air-blast: Cut back air-blast. Adjust blower slightly upward.

6.

Brush: Adjust with light pressure; when the brush is adjusted with heavy pressure, under unfavorable atmospheric conditions, static electricity is liable to be generated with onion skin stock.

7.

Delivery air-blast

a) Automatic Cylinders of the S-line

The air-blast motor mounted behind the control box produces an air-blast for the 6 curved delivery blowers. The holes in these blowers are so arranged that the air-blast smooths the sheets and allows them to be conveyed safely on to the telescopic delivery bars.

The air blast is regulated according to paper quality and printing speed, by means of the valve located behind the door of the control lever panel. Set full air blast from the blower for normal stock, cutting it back for onion skin.

For smaller sheet sizes close with adhesive tape 1 or 2 air holes in each of the blowers, laterally extending beyond the sheet size. When changing over to larger sizes, do not forget to remove the tape.

This air blast also serves for cooling the control box whenever printing is effected at slow speeds over extended periods.

Delivery air blast (directly above the delivery pile), produced from the pump, to be regulated by set screw "0-1". Place swivel-type air blast nozzles directly above dropping sheets.

b) Automatic Cylinders of K-line

Adjust air blast of the two blower holes at front paper stop and use the vacuum sheet brakes.

8.

Sheet Guides and Telescopic Bars (S-line)

Mount plush covers (6 supplied with each machine) on the sheet guides, at sheet turning point of delivery, fixing the plush covers to the guide bar with the tapes. Adjust telescopic delivery bars alternately, with varying lengths so that the end of the sheet will be slightly projecting. Moreover, stick strips of "Tesamoll" to bars (see also page 26). This is achieved by either sticking "Tesamoll" to every second bar, or to each single bar, while a second strip is stuck to every third bar in the latter case.

Running Cardboard

Which adjustments are required?

1.

Means of sheet separation: Place rubber suckers on the suction bar, in numbers depending on the thickness of the cardboard, as for instance on alternate suction holes. When running extremely heavy cardboard which may be wavy, molded rubber suckers will be found more suitable. Those suction holes not covered by rubber suckers must of course be closed.

The use of rubber suckers could result in the picking up of double sheets. This is why the sheet separator springs in front and on either side are, as a rule, not retracted. Furthermore, the two double-sheet detector devices are adjusted so that only one sheet is allowed to pass under them.

Each suction bar of any OHC supplied after the middle of 1965 is vertically spring-mounted. Thus the suction bars are self adjusting to the wavy surface of the feed pile and often make the rubber suckers unnecessary. So the risk of double sheets being picked up is considerably reduced.

2.

Feed air blast: It is generally advisable to operate with full feed air blast - K-line presses. This is achieved by cutting back the delivery air blast. In any case the weight of the cardboard makes the delivery air blast practically superfluous. The holes in the air blast bar should be regularly cleaned with the 1 mm drill or pin supplied with the machine. This will eliminate many a claim that would otherwise be made because of an inadequate air supply.

3.

Suction bar tilt: If rubber suckers are used on the suction bar, thin to medium-strong cardboard can be run well with the full suction bar tilt, which is even advisable. Only with increasing thickness, from about .020" up, we recommend operating with less tilt, with indicator on "Cardboard".

4.

Paper feed: With increasing thickness of stock, put paper feed indicator, on, or near "Cardboard" setting.

5.

As a rule not more than 2 sheet smoothers, or with large sizes, a maximum of 4 should remain on the machine.

6.

Setting of front lays: If wavy or extremely heavy cardboard is to be printed, increase distance between front lays and feed board. With machines of the S-line, turn the two lateral adjusting nuts on the swinging grippers to "Cardboard". On K-line machines, the hexagon screw of the front lay shaft, on the operators side, is likewise turned to "Cardboard".

7.

To eliminate scratching of the top sheet, attach cardboard sheet guides to bar. When running extremely heavy cardboard, use sheet guide ribbon (special accessory) or sheet guide roll (special accessory of K-line machines only).

8.

Brush: Adjust with light or heavy pressure, according to the cardboard weight.

Heidelberg Form Positioning Devices

These enable the printer to prepare the form away from the machine. For positive registering in the chase when making up, we supply a simple device with transparent foil, as a special accessory. With these devices the individual color plates of a multi-color job, or plates mounted at oblique angles, as used for printing folders, can be imposed with great accuracy, without the form having to be justified on the machine. For still more convenient positioning of type forms we can supply a foil with squares. Yet another inexpensive device is the special composing stone. This device is an exact replica of an OHC typebed, in all its details. Its side bearers correspond to the bearers on the typebed. The head is equipped with chase stops, the tail with chase locks, identical to those of the type bed. A pre-registering image is obtained with the transparent foil. It is impossible to distort the chase when tightening the quoins. With this Heidelberg form positioning device you can both lock and pre-register the form and obtain final positioning. Thus, while one form is being printed, the next one is prepared off the press (see illustrations 1 to 3).

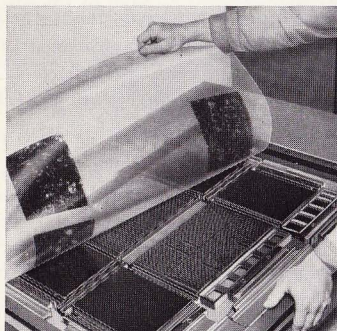
Another most useful and time-saving accessory is the Heidelberg form positioning device with register indicator and sighting glass. This special composing stone with rule running in parallel



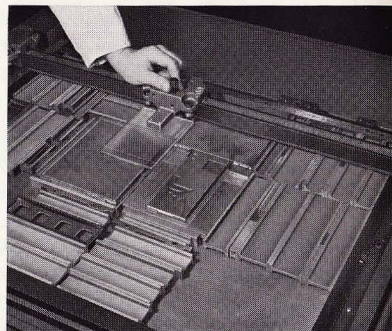
1 Inking



2 Image



3 Lifting of pre-registering foil



4 Register indicators with sighting glass

direction allows still more rapid and accurate positioning (see illustration 4).

These favorably priced form preparation devices are accurately adapted to the requirements of a production machine. They can also be used with the Heidelberg two-color rotary + flatbeds (see pages 93/94).

Pre-registering devices for locking up the form of the OHC have in recent years been developed, in cooperation with us, by suppliers to the printing trade. Ask our agents for more information.

7 Quiz Questions

Mark the "Yes" or "No" columns with an "×" and then check your answers on pages 94-96 of this booklet.

1 When printing a halftone, you find that the dot is slurred towards the tail edge of the sheet. To obtain a perfect unrolling action, do you reduce the cylinder packing by one sheet which you lay under the plate?

2 The rubber rollers are firmly encrusted with ink. Since a roller cleaning solvent proved useless, do you now try to remove the ink crust by rubbing the roller strongly with a type cleaner?

3 In using steel cutting or die-cutting rules on the Original Heidelberg Cylinder, should these be somewhat over type-high?

4 When printing a heavy solid, the ink picks. Do you try to eliminate this problem by adding a paste reducer?

5 If out of roller wash-up fluid, will it do to use kerosene for a couple of days? Or turpentine? Or soapy water?

6 When printing heavy cardboard, should the grain run the short way of the cylinder?

7 When printing an ordinary type form, can you remove the third or fourth form rollers and produce the job with two form rollers only?

Yes	No

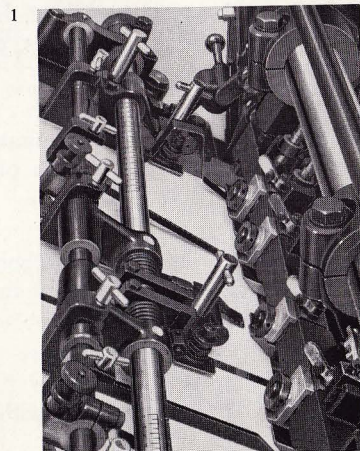
Accessory for Two-up Feed

This is part of the K-line OHC standard equipment and is available as an extra accessory for the S-line machines. It allows the printing of two sheets side by side, which will double production of small-size sheets. This accessory is eminently suitable for processing remnants and odd sizes of paper and permits two different jobs to be printed on the press simultaneously. Care should, however, be taken to use paper of equal thickness, though the sizes need not be identical.

When printing tabular forms with the rules running in two different directions, simply exchange the feed piles instead of altering the form. It is also possible to run two different colors side by side when two- or multi-color forms are printed.

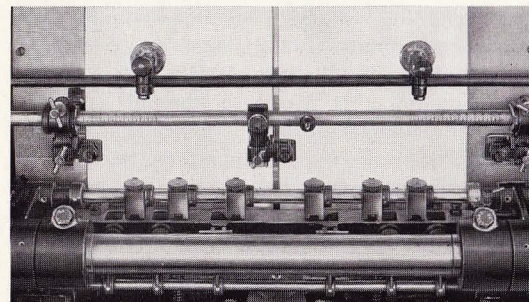
Should your daily routine work call for such special jobs, we suggest that you consult your Heidelberg representative who will be glad to assist you with his expert advice.

As to the adjustment of the front lays for two-up feed, please refer to pages 19 to 22.

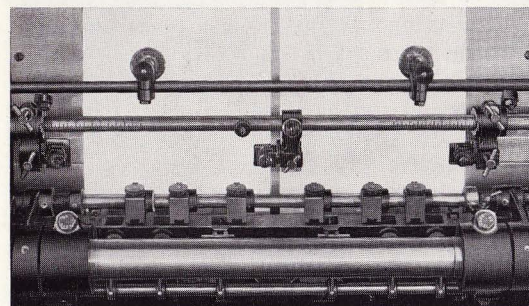


OHC S-line: Center-lay

Accessory for two-up feed



OHC K-line:
Side-lay settings
for two-up feed



2
Side-lays for first-
form printing

3
Side-lays for
printing on back
of sheet

The selection of the side lays depends on the work, and the machine type available. With S-line machines the two standard side lays moving in opposite directions will normally do, e. g. for work to be printed on one side only. If, on the other hand, the two feed piles must be packed up separately, a center lay should be used (see illustration 1). With all K-line machines with their side lays moving in one direction only, the center lay is a must (Illustrations 2 and 3).

Numbering with plunger operated numbering machines

The impression cylinder of the machine is lifted by about .060" when impression is thrown off. Because of this, when working with plunger operated numbering machines, special numbering devices with a plunger stroke of approx. .040" only should be used, to eliminate the imprint of the plungers on the cylinder packing. This will, in addition, protect the rollers. To ensure an absolutely accurate operation of the numbering devices, small metal strips should be stuck on the packing surface contacted by the plungers. This will eliminate the plungers gradually cutting into the packing during the run, and so prevent the numbering device from failing to operate. The small metal strips generally supplied with the numbering machines are stuck on with special adhesive. For safety the strips are, in addition, secured by cellophane tape.

For inking, two rollers of synthetic material should be used, because their surfaces offer more resistance to the plunger impact than ordinary rubber rollers. It is also for reasons of economy possible to use synthetic rollers which have been used previously.

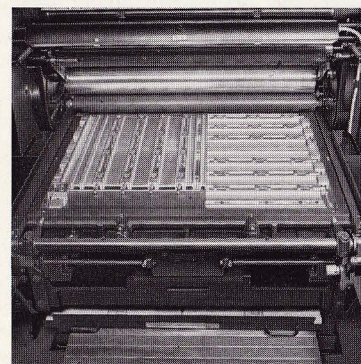
Numbering with centrally operated numbering machines

If it is desired to work with numbering machines in large quantities, as required for security printing, then the centrally driven numbering machines would be most suitable. They are 100 % reliable in operation.

Centrally driven numbering machines can be fitted to any OHC standard chase which, for this purpose, is provided with a .240" bore on both the head and tail bars of the chase. When the numbering machines are fitted, these two holes guide the push rods. Swing levers can be fitted to the rod at any distance from each other. These swing levers are also fitted at the ends of the indexing bars on which the numbering machines are positioned. Moreover, it is also possible to use the centrally controlled numbering machines, together with typematter or electros in one form. In such cases the index bars are guided through hollow mounting material on which the electros can be fixed.

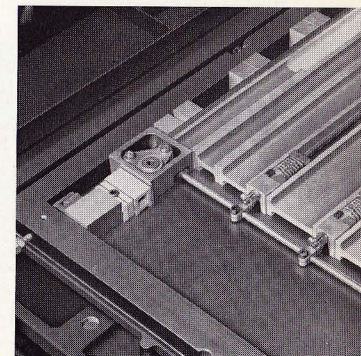
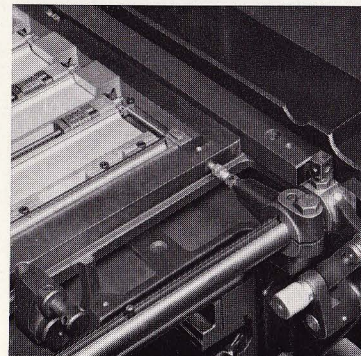
Stops supplied with this special extra device and built into the machine will actuate the push rod. When the machine operates with the impression thrown off, these stops are likewise disengaged. Thus, for instance, the numbering machines will be stopped immediately in case of misfed sheets.

Our special device allows simultaneous operation of two push rods. This is effected by means of an angular indexing mechanism, with the numbering machines inserted at right angles. Furthermore,



Centrally driven numbering machines in OHC cylinder of S-line

- 1 Numbering form, for lengthwise and crosswise numbering
- 2 Push bar for crosswise numbering machines
- 3 Angle reversing device with push bar for lengthwise numbering machines



numbering machines can be used, with one of the push rods, that differ from the numbering boxes of the other push rod, as to size or stroke. Numbering boxes with figures of sizes from $\frac{1}{8}$ to $\frac{1}{4}$ " or 6 to 14 pts can be supplied for both the K- and S-line of our automatic cylinders. Machines of the S-line are also available with a low type bed, allowing operation of numbering machines with figures in sizes up to $\frac{17}{32}$ " or 38 pts.

Centrally operated numbering machines need very careful attention. After long runs they should be placed in a kerosene bath for one or two days to dissolve remnants of ink which might otherwise contaminate or gum up the mechanism and disturb its function and, after cleaning, before the numbering boxes are used again, it will be advisable to lubricate them with a few drops of a good machine oil free from resin.

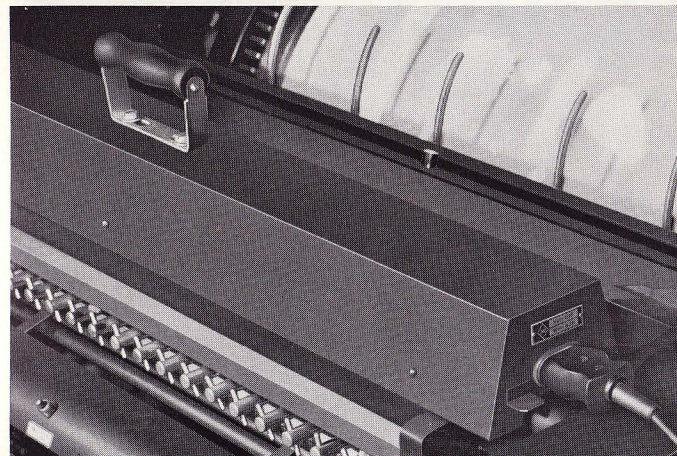
The perfect operation of centrally driven numbering machines can be affected by varying machine speeds. We would therefore recommend, if possible, to maintain the speed to which the device best operates.

In addition to the general directions stated here, careful attention should be paid to operating instructions from the manufacturers of the numbering machines concerned.

Carbon Printing and Ink Fountain Heating

Although special machines and methods – such as the transcrit process – do, of course, exist for carbon printing, there are many printing jobs for office use, requiring relatively small runs, that cannot be produced economically except on platens or cylinder machines. For these simple carbon jobs the various ink manufacturers have evolved inks that can be used straight from the can. As these inks are as a rule, very sticky, it is advisable, to use our ink fountain heating device. All you have to do is to place it on the ink duct and connect it to a plug-socket. No changes on the machine are required. During the cold season the ink duct heater can also be used to advantage for warming normal printing inks.

Heating equipment for ink duct



Embossing on the OHC

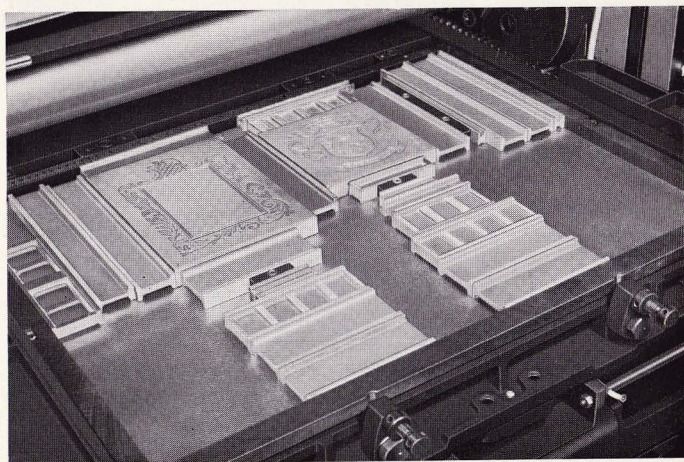
Due to its tremendous impressional strength and the absolute rigidity of its printing unit, even heavy forms can be perfectly and economically embossed on Original Heidelberg Cylinders. With the embossing form made up properly, the machine can run an average of 3,000 embossings an hour.

The female die

All embossing jobs require a female die (embossing plate). In this die the design or lettering is engraved in recess. The female die is usually of brass, although for very long runs steel is used. In many cases electrotypes are popular for embossing but, owing to the heavy strain on the material, they should be nickel or chromium plated. The die must definitely be mounted on a solid base.

Do not fasten the mounts by means of bevel clamps, but with double-sided adhesive foil, preferably a heat sealing foil. Better still, screw or rivet the die to its mount, particularly in the case

Embossing form with two large dies



of hot embossing. An essential condition for satisfactory work is, of course, dies and mounts of exact type height throughout, otherwise the "unrolling" of the cylinder will be affected and wear will occur which will soon ruin even the most carefully prepared counter (male) die.

Final positioning

For final positioning a normal packing may be used.

Preparing the impression cylinder

In order to carry out embossing, the male die, the counterpart of the engraved embossing die, has to be made. It is mounted on the cylinder and must have all details in relief of the embossing die. Only then can embossing be really effective. Before the male die can be made, the cylinder has to be suitably dressed. To achieve this, either of two successfully proved methods can be used:

1.

For smaller subjects and short runs a pressboard sheet of about .016" thickness is clamped to the bare cylinder surface. It is in addition fastened by means of adhesive foil, to prevent it from shifting during the run. The male die is then mounted on the pressboard sheet.

2.

The second method is suitable for larger subjects, particularly for large forms and runs, from 50,000 embossings upward. When using the latter method, an embossing jacket of .020" thickness instead of packing is drawn tight to the cylinder. The male die is mounted on the jacket.

Making the male die

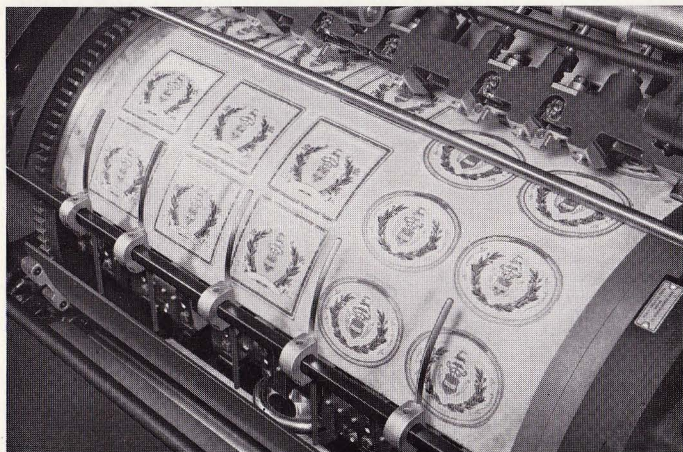
There are various ways of making the male die. Here we describe the most successful method.

Normally required to make the male die are 1 or 2 sheets of blotting card, as used for blotting pads, together with 1-2 sheets of

thin, non-fluffy blotting paper for the finer parts and the hairlines. Thickness and number of the blotting cards depend on the engraving depth of the female die.

After final positioning of the female die or dies, make an impression on the pressboard sheet on the impression cylinder. Impressions of the embossing form are also made on the blotting cards. Now the inking system is washed, the lateral ink distribution is disengaged, and the inking rollers are removed. The negative areas, i.e. the areas not showing an impression, are cut out from the first blotting card with a pair of makeready scissors at a distance of 2 pts around the design (the "image"). The cut out pieces are pasted on the exactly corresponding places of the impression previously made on the cylinder. Next, allow the machine to run on impression. The blotting card is thus forced in

Male dies on embossing plate



relief into the embossing die, shaping the male die on the cylinder. This relief, however, is not sufficient for embossing. Therefore, cut out again the negative areas from the second blotting card, this time at a distance of 4 pts around the design and paste them over the first layer of blotting card and pull another impression. Now the male die is almost ready for embossing. 1-2 sheets of thin blotting paper, added to the male die, are to produce the finest parts of the engraving. Each "image" cut out in the manner described should, with its contours, be about 2 pts wider than the previous one.

The male die during preparation should be sprinkled with talcum to prevent the adhesive from sticking to the embossing form. Should the embossing be too weak at any part, thin blotting paper or tissue paper can be applied to the corresponding areas of the male die. It is necessary that each time the male die has been reinforced, the female die should be thoroughly cleaned to remove any traces of adhesive squeezed out from the male die. Providing the male die has been properly prepared, 50,000 or more embossings can be made.

The male die, used for embossing work on cylinder machines, should have a certain elasticity. Because of this, selfhardening embossing compounds, as used for platens, are not always suitable for cylinder presses. Particular care should also be taken that pressure be applied to the embossing contours only, otherwise areas which are not to be embossed will get an unsightly, glossy appearance, especially with hot embossing on grained paper.

There are a number of other methods for which sealing lacquer, pastes, rubber or embossing foils are used. All these processes have also proved quite successful, though some of the materials named will not fully relieve the pressure on the parts not to be embossed and so impose an undue load on the machine.

Hot embossing

For hot embossing work on Original Heidelberg Cylinders we have developed a heating device which will heat up the forme

to temperatures ranging from 158 to 194° F. Hot embossing offers the following advantages:

1.

The stock, even brittle paper or cardboard, will not so easily crack at the embossing contours.

2.

The embossing contours, and all the finest detail will turn out better. Moreover, the embossing itself will be better preserved for a longer period.

3.

Hot embossing of gold ink printing increases the gloss, a feature highly appreciated by customers. An improvement of the glossy appearance can easily be achieved on dull finished chromo papers. To obtain a very high degree of brilliancy, avoid using too finely grained bronze powder. A powder of medium grain will produce best results.

4.

The gold ink will offer a better surface resistance.

Mounting the heating plate

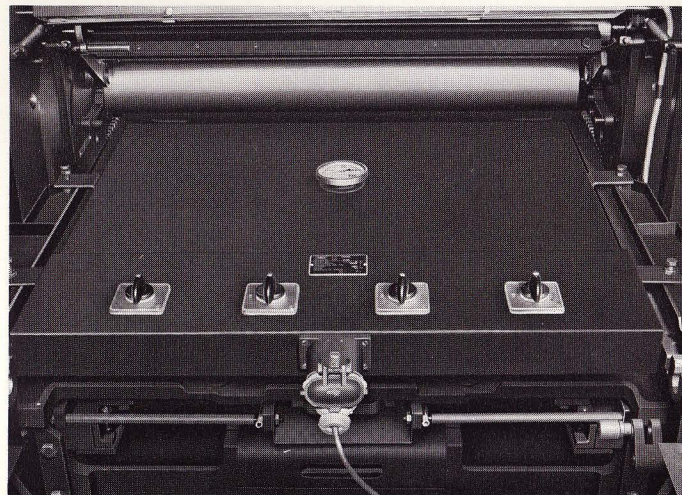
The heating plate is mounted after the embossing form has been completely positioned and made up as described in the preceding paragraph on cold embossing. For hot embossing a tin foil of .004" thickness is placed underneath the form. The tin foil should cover up the whole typebed, it is to reflect the heat rays not taken up by the form and to prevent too much heat from being deflected to the typebed. By the reflection of the heat rays the time required for heating the embossing form is thus reduced. Before the plate can be inserted, all rubber rollers should, of course, be removed from the inking mechanism. By means of 4 adjusting screws the heating plate is set at a distance of $\frac{1}{4}$ to $\frac{5}{16}$ " from the surface of the embossing dies, and approx. $\frac{7}{16}$ " from the steel inking cylinder.

Switching on and controlling the infra-red heating

The heating plates are available in two sizes: for K-line machines with two heating zones, with the corresponding control switches, for S-line machines with four heating zones. The heating plates are fitted with a thermometer indicating the heating temperature. the latter should not be confused with the temperature of the embossing die which is lower. After a two hour's run a heating plate temperature of 284° F will correspond to an embossing plate temperature of approx. 194° F. The heating zones can be separately controlled.

When heating up, all heating zones are switched on and the machine is turned to a position where the typebed and the embossing dies are positioned directly below the heating plate.

The most favorable temperature of the embossing die is around 176° F and is reached in approximately 20 minutes of heating time. Before embossing, the heating zones below which there are no embossing dies, should be switched off.



OHC of S-line: Heating plate for hot embossing

When the machine comes to a standstill, move the typebed with the dies, to a position below the heating plate so that the form is kept hot.

Connecting the heating plate

The heating plate is connected to the power supply by means of a standard plug and socket. The socket should, for the sake of convenience, be fitted to the base of the footboard. The current is taken from the control panel of the machine. A power plug, with a long cable, is included with the equipment.

Profitable Cutting and Creasing

Die-cutting on the OHC

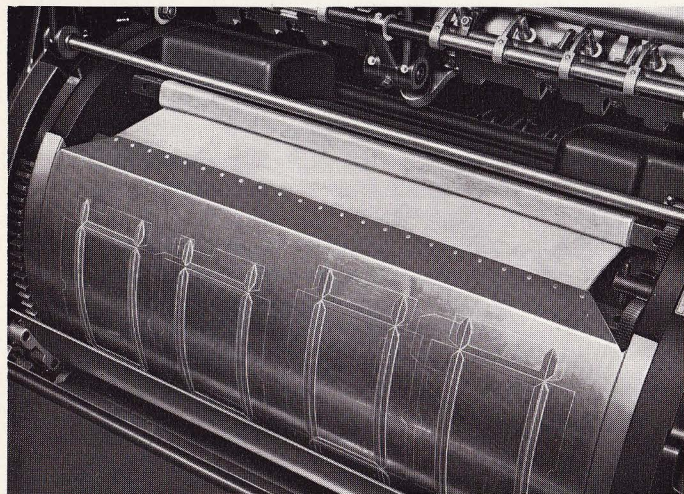
While the Heidelberg cylinder is essentially a high-quality letterpress printing machine, its powerful construction and large-diameter cylinder are well-suited (with certain reservations) to highspeed cut-out and embossing work. Large, simple shapes such as envelopes, folders, cartons and cut-outs in showcards are most suitable. Multiples of small-size cut-outs are best avoided, for the sheet tends in such cases to lose rigidity, with the risk of separation in transfer to the delivery grippers. Stock up to .030" thick can be handled by the S-line Heidelberg cylinders; but stiffness is more important than thickness. Since the board must lie close to the cylinder, the less flexible it is the thinner it must be. Stock should always be cut with its grain parallel to the cylinder's axis, so that the board's natural curvature conforms to the cylinder's curve.

Preparation

All inking and distributor rollers removed from the machine. Since it is vital to protect the precision-ground cylinder and typebed from damage by rules, a steel jacket is fitted over the cylinder, and a make-ready plate placed on the bed.

The jacket replaces the normal cylinder packing. It is of .030" chrome vanadium steel; one end angled to fit the cylinder's packing clamp, the other end provided with a canvas strip for winding around the reeling bar. Sufficient packing is used beneath it to bring the jacket up to the normal .047". The angled edge of the jacket has holes, to fit over the pins inserted in place of the packing pins.

The underlay, composed of carton and filler sheets, is approx. .016", but should not be in the packing clamp. We recommend pasting the underlay's front edge on to the jacket's inner side, approx. 6 pts from the front edge. To prevent the underlay slipping off, use an adhesive which is still elastic after drying.



Clamped on, completed die-cutting jacket

Clamping the die-cutting jacket

1.

Remove the cylinder packing pins, replacing them with the special parallel pins provided. This ensures correct re-location of the jacket after removing to prepare matrix.

2.

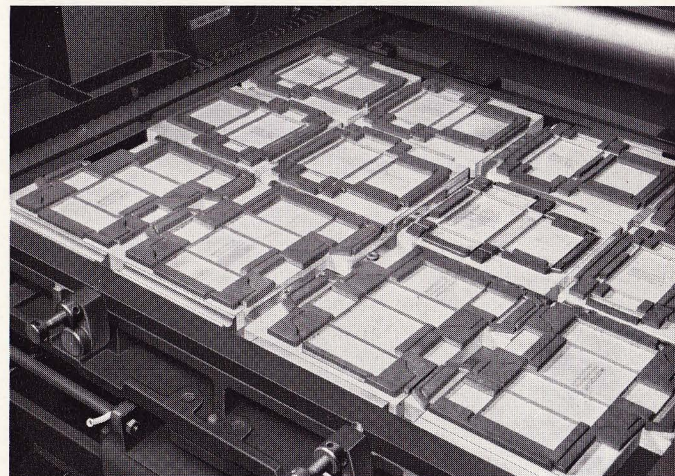
Introduce the jacket on to the pins, and lightly turn the clamp handwheel to hold the jacket without forcing.

3.

Inch the machine until the reeling bars are exposed. Fix the rivetted blanket to the second reeling bar, and draw with only hand tension.

4.

Inch the machine to expose the clamp. With a rubber hammer, tap the jacket's grip edge and tighten clamp: this helps the jacket to lay true to the cylinder on the grip edge.



Full die-cutting form, Rubber ejectors clearly visible

5.

When jacket is true, tighten the cylinder clamp fully. Inch machine to expose reeling bars and, with the long pin-wrench inserted in each end of the reeling bar, pull to draw jacket absolutely taut to the cylinder.

To remove the cutting jacket in order to prepare the matrix, first slacken off the cylinder clamp, so that the jacket is still held by the parallel pins. Inch the press until the reeling bars are exposed, release the reeling bar, and switch off the power. Take off the brake and, turning the press backwards by hand, undo the exposed clamp and remove the jacket (avoiding too much strain on its angle-edge).

Die-cutting form

Standard .937" rule for conventional cutting machines is not suitable for use on the Heidelberg cylinder printer. The latter is built to work correctly at type height (whether printing, cutting or

embossing), and the rules plus make-ready plate should together be .918" high. Since the make-ready plate is .018", cutting rules should be ordered .900" high. The creasing rules should be correspondingly reduced to maintain the normal difference in height between them and the cutting rules.

Make-ready plate

All make-ready should be undertaken beneath the type-bed protection plate (make-ready plate) under the die-cutting form. No make-ready must be done beneath the jacket. The purpose of the plate (.018" steel) is to protect the type-bed from damage by the bottom of the rules under impression. It also provides a means of make-ready for any low areas in the cutting form.

Makeready

Care should be taken that the first die-cutting operation be done without excessive pressure being applied to avoid damage to the cutting rules. The heaviest areas of the form should just cut through the stock. All areas being too weak must be made-ready accordingly.

If a protective and makeready plate of refined steel is not available, makeready is done on a tympan sheet placed between impression cylinder and die-cutting jacket. It is not practical to place the makeready directly under the steel cutting rules, as the rules would cut through it after a few die-cutting impressions.

When using the protective and makeready plate, place a make-ready sheet, with a sheet of carbon paper, between protective plate and the form in such a manner that it contacts the front stops and one of the bearers along the side. Now run a sheet through the machine. The power of the impression applied will make the steel cutting and creasing rules appear clearly on the makeready sheet. Thereafter, remove the sheet and do the makeready with the aid of the previously cut sheet. After levelling up, the sheet is placed under the protective plate.

Levelling-up make-ready

When simultaneously die-cutting and creasing, a female matrix must be used on the impression cylinder. Using a strong adhesive, pressboard or cardboard is pasted on the die-cutting jacket's blank surface. A sheet of carbon paper is attached, and an image pulled. Areas marked by the creasing rules are then cut out with a make-ready knife, and the waste cardboard removed from the areas marked by the scoring rules. The remaining cardboard is chamfered off to the outside.

Retaining cut-out sections in sheet

All cut-out portions must be held and delivered with the sheet, to keep driving rack and cylinder racks free from paper fragments. To achieve this, the cutting form (steel rules anchored in a plywood base) may require slight nicks at suitable places in the rules, so that cut-out portions adhere to the stock and may easily be stripped out later by hand. To help clear intricate sections, sponge rubber ejectors (sometimes rubberized cork) are normally incorporated in the cutting form.

Cutting small areas

When the cut-out portion occupies only a few inches of the sheet, it is sometimes possible to dispense with the jacket, and instead to secure a piece of steel plate (larger than actual cutting area) to the cylinder surface.

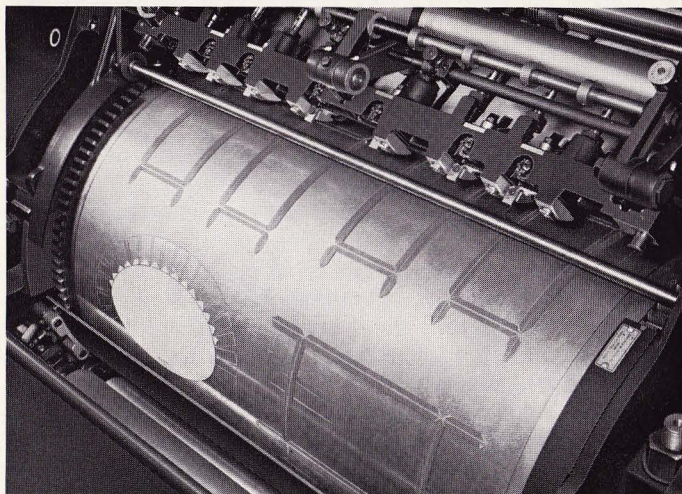
For this, .040-.044" polished steel sheet is best, cut to size by the supplier (so that edges do not bend in trimming), and curved to an arc slightly smaller than the cylinder's curve, so that when the plate is stuck firmly to the cylinder with double-sided adhesive, the ends cling to the surface rather than project. A further safeguard is to trim the corners off, leaving an approx. $\frac{3}{8}$ " overhang. When attaching to the cylinder, cut the adhesive about $\frac{1}{4}$ " larger than the plate all round. The adhesive is first applied to the cylinder, then the plate is pressed firmly on to it so that there is no trace of spring.

A manila sheet, slightly larger than the plate, is next pasted over it, and over that a full-size manila top-sheet (as for normal cylinder packing) is clamped and tightened with the reel bar. The combined thickness of the steel plate and adhesive should be .047", the normal packing thickness.

Simultaneous die-cutting and scoring or creasing

There are two different methods of producing the female creasing matrix.

- a) A manila sheet, previously moistened, is pasted on the die-cutting jacket to make it fit tightly. Thereafter attach a piece of carbon paper to the die-cutting jacket, carbon side facing the impression cylinder, and take an impression so that the contours of the creasing rules will appear on the manila sheet. Now paste pressboard strips on both



Male dies of mixed cutting and creasing form; bottom left hand: an interesting cut-out for the simultaneous die-cutting of a paper cup and circular creasing of the cup bottom

sides of these contours, the distance between the strips depending on the thickness of the rules and the cardboard to be run. If the creasing rules run in the grain direction of the cardboard, the distance can be reduced.

Conversely, with the rules running in the other direction, the distance between the strips should be wider to prevent the cardboard from cracking.

- b) A pressboard sheet is pasted on the bare surface of the die-cutting jacket. Also here a sheet of carbon paper is attached and an impression pulled. The areas showing the contours of the creasing rules are cut out with the makeready knife. The pressboard areas marked by the creasing rules are removed, and the outer edges of the remaining board chamfered off.

Note: The $22\frac{1}{2} \times 32\frac{1}{4}$ " Original Heidelberg cylinder can, with some design changes and without inking mechanism, also be supplied as an automatic cutter and creaser, i. e. as a special-purpose machine. For further particulars please consult pages 88-90 and our special folder containing full details.

Simultaneous Printing and Perforating – Cutting

Perforating and die-cutting on the OHC

We have for the Heidelberg cylinder press a special accessory for longitudinal perforation, i. e. for perforating in the circumferential direction of the cylinder. This device gives excellent results and is used in many printshops, particularly in cases where two operations would be required for one run, as printing and perforating, for instance. These two operations can be performed on the Heidelberg automatic cylinder in one operation.

The special accessory consists of the following components:

1.

Perforating wheels mounted in holders set up on a bar, in front of the cylinder. These wheels are available for 14 different kinds of perforation (dots and dashes of different cutting lengths), and as cutting wheels (see illustration on page 83).

2.

On the impression cylinder steel bands in a width of .237" (or .118" on request) act as cutting bands for the wheels. The steel bands are, at the front end, bent at right angles and are fastened by means of the packing clamp. A hook is provided at the other end which is linked to the rear draw bar. Finally, the steel bands are tightened by means of a turnbuckle.

3.

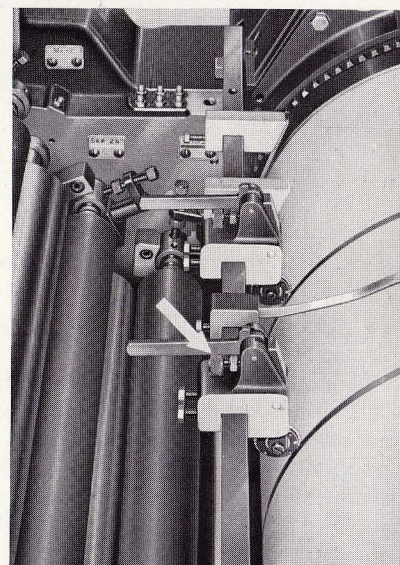
A brush divided in the middle (with a full width brush for K-line machines) smoothes the sheet to the cylinder before the perforating is started and thus ensures a straight perforation over the whole of the sheet.

If on automatic cylinders of the S-line a perforation is effected in the middle of the cylinder only, it will suffice to use one brush. For any other perforating jobs both brushes are required. The steel bands must always be located between the cylinder grippers. In other words, the perforating wheels must not be allowed to run across the grippers. Both the Heidelberg form positioning device and the scales on the chase simplify makeready work for such jobs.

In order to ensure that the steel bands are placed on the cylinder absolutely straight and parallel, it is advisable to pull an impression on the tympan. In this way, the accuracy of the positioning can be checked. Moreover, during form positioning it should be noted that because of the lay edge, the perforation cannot be done right up to the paper edge. When a standard chase is used, the perforation will not start until approx. $\frac{5}{16}$ " from the paper edge. The perforating wheels are set against the steel bands by means of the adjusting screw on top of the holders.

Engage the perforating wheel by releasing the longer lever. The wheels should be adjusted in such a manner that they run straight along the steel bands, without being too deeply set.

On the other hand, the height of the wheels can also be adjusted in accordance with the stock to be run. Care should be taken to



Perforation in center of cylinder. Adjusting screw (arrow) for adjustment of perforating wheel

ensure that the wheels do not bear too hard at the starting edge of the band. When the machine is stopped or runs off impression for any length of time, the perforating wheels should be disengaged. This is done by lifting the long lever which will prevent the wheels from being subjected to any unnecessary pressure.

Non-continuous perforation

Our special device also permits non-continuous perforation. To this end 2 pt. brass rules about $\frac{5}{16}$ " wide are used on the impression cylinder. They are cut out at those places where no perforation is needed. The cutting out of the brass rules is simple enough: clamp them in a vice – make two cuts with a saw – knock out the part between cuts with a hammer. At the front ends the brass rules are held by the packing clamp, at the rear ends they are stuck down with adhesive and additionally secured with some adhesive tape (see illustration page 85).

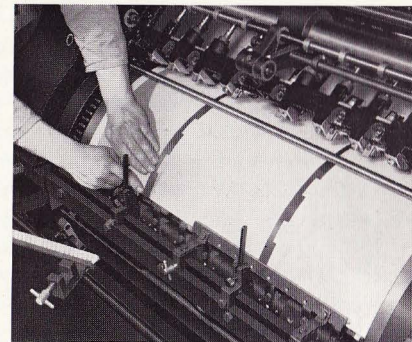
Between brass rules and text matter a space of at least .120" must be left in order to avoid slur. The height of the brass rules can also be reduced by cutting away the packing. In such a case the impression of the perforating wheels will have to be adjusted accordingly.

Non-continuous perforations present no difficulties with stock ranging from paper to heavy cardboard of .020" thick.

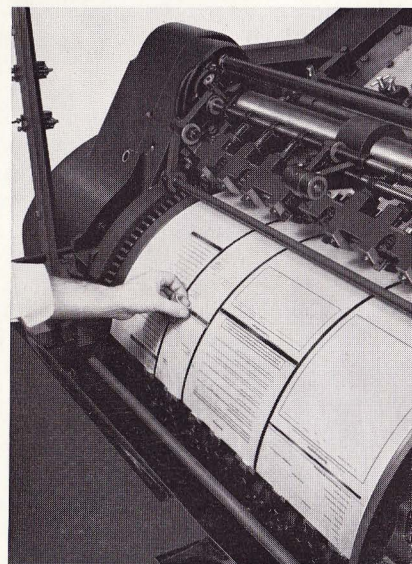
Perforating lengthwise and crosswise

We know of numerous printshops printing multi-color jobs on Original Heidelberg S-line cylinders, then halving the sheets and finally printing the last color in combination with the perforating operation, on Original Heidelberg K-line cylinders. This change-over from one machine to another offers one further advantage: Large sheets of sizes $22\frac{1}{2} \times 30\frac{1}{4}$ " or $22\frac{1}{2} \times 32\frac{1}{4}$ " can be perforated when the last color is printed, if necessary. After cutting the sheet in half, another perforation can be done on the $15\frac{3}{4} \times 23$ " or 18×23 " Original Heidelberg Cylinder, but this time at right angles to the first perforation. Thus you can per-

Non-continuous perforation



with left-hand brush-half removed for setting



Lengthwise and crosswise perforation in one single operation

forate lengthwise and crosswise without any additional operation. It is, of course, assumed here that a certain number of printing operations is required and that it is possible to cut the sheets in half and to print on two machines. If perforation work lengthwise and crosswise is to be done on one single machine, in one operation, perforating rules for cross perforation must be mounted in the form. We supply for use in our automatic cylinders steel strips .120" and .240" wide, in lengths of $3\frac{15}{16}$ ", $5\frac{15}{16}$ " and $7\frac{7}{8}$ ". Thus the printer need not resort to unsuitable material. When printing and perforating crosswise, simultaneously and from one single form, the following should be observed:

1.

Adjust form rollers to correct type height.

2.

The perforating rules mounted in the printing form could be .008" lower than standard die-cutting and perforating rules which are normally type-high.

3.

When positioning the rules in the form, good care should be taken that the back of the form be clean, in order to prevent the perforating rules from being forced up by foreign bodies and making contact with the form rollers.

4.

The difference in height between the perforating rules and normal type height is compensated on the packing by means of the metal strips. They should be cleaned on the adhesive side, and stuck with a good all-purpose adhesive.

5.

When the metal strips have been stuck on, and the adhesive dried, secure the strips additionally with adhesive tape. Self-sealing thin steel with small serrations in the center (such as Perfo-Strip) have also shown satisfactory results. They can be

stuck on the impression cylinder packing both lengthwise and crosswise.

Reglets serving as pressure bearers are to be positioned in the form. Such reglets should, of course, be lower than type-high to prevent their inking.

Numerous printshops have told us how very simple any perforation job can be done on Original Heidelberg automatic cylinders, no matter whether perforating work is to be done lengthwise or crosswise, or whether even mixed perforations are involved. Naturally, with suitable jobs much time is saved by the fact that perforating is done in one pass with printing of the last color, or, should one color only be needed, together with the printing operation.

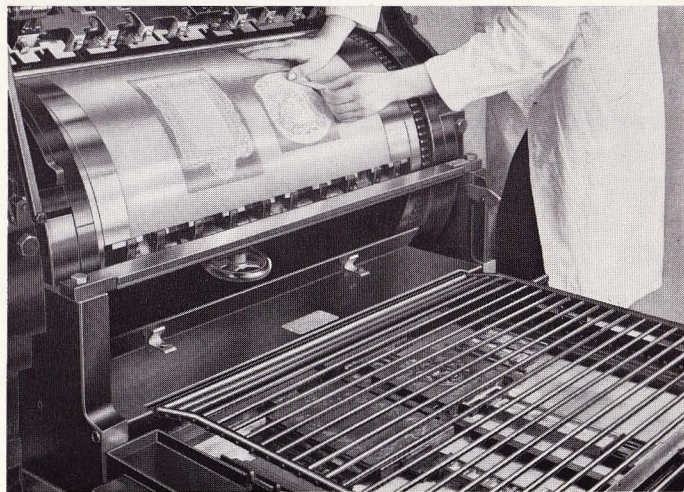
Heidelberg Automatic Cylinder Cutter and Creaser 22 $\frac{1}{2}$ x 32 $\frac{1}{4}$ "

Its design – its operation

Printing establishments frequently engaged in doing die-cutting work will be well advised to install a Heidelberg automatic cylinder cutter and creaser. This machine was developed from the Heidelberg automatic cylinder press. Numerous jobs can be accomplished on this machine with stock ranging from paper to cardboard of up to .032" at speeds up to 4,600 sheets per hour – this depending on the quality of the material.

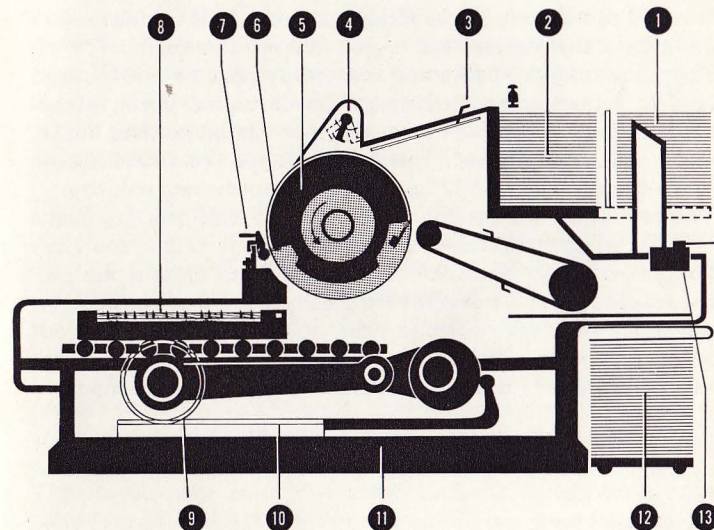
Extra accessories permit economical perforating, creasing, scoring and cutting. Our remarks on pages 82–87 on these interesting special applications apply also to the Heidelberg cylinder cutter and creaser.

Sheets printed on large-size offset machines or letterpress sheet-fed rotaries and subsequently halved, can also be favorably processed on the Heidelberg cylinder cutter and creaser. In such cases it will be necessary, of course, to use a modern cutting



Male embossing dies on OHC die-cutter

Cylinder cutter and creaser



Cross section of OHC die-cutting cylinder

machine for halving the sheets with very close cutting tolerances. The diagrammatic view shows the set-up of the Heidelberg automatic cylinder cutter and creaser.

① Pre-loading device ② Large feed pile ③ Four positively operating feed grippers ④ Swinging grippers ⑤ Heavy, continuously rotating die-cutter cylinder ⑥ Die-cutting plate of stainless or hardened steel ⑦ Perforating device ⑧ Easily accessible die-cutting forme, absolutely rigid die-cutting bed on 4 precision-ground roller tracks ⑨ Bed drive pinion ⑩ Gear rack synchronizing movement of type bed and rotation of cylinder ⑪ Heavy, reinforced base of Heidelberg special alloy casting ⑫ Delivery pile with continuous delivery device ⑬ Single lever central lubrication.

It is real plus feature of the Heidelberg automatic cylinder cutter and creaser that the type bed is ground down to a height of .976". This allows the protective and makeready plate of .040" refined steel to be accommodated under the die-cutting form. Make-ready is done off the machine and then placed between make-ready plate and type bed. This design of type bed allows the use of die-cutting rules of .937" as used in the boxmaking industry. The convenient pre-loading device of the Heidelberg automatic cylinder cutter and creaser for maximum pile height and swift change-over is of particular importance when cartons are pre-loaded. The big feed pile offers the means to pre-load considerable quantities of thick material. The equipment for continuous delivery allows wheeling off of a full delivery pile and the insertion of another delivery board without having to stop the machine.

Technical specifications (as of April 1967)

Designation	SBBS
Maximum sheet size	22 $\frac{1}{2}$ x 32 $\frac{1}{4}$ "
Minimum sheet size	8 $\frac{1}{4}$ x 11"
Inside measurements	
Standard chase	21 $\frac{1}{2}$ x 30 $\frac{1}{2}$ "
Skeleton chase between bearers	21 $\frac{1}{2}$ x 31 $\frac{1}{2}$ "
Maximum die-cutting speed	4,600 iph
Net weight	abt. 11,000 lbs
Power requirements	6.2 kW = 8.5 HP
Length	9'10 $\frac{1}{4}$ "
Width	6'4 $\frac{3}{4}$ "
Height	4'9 $\frac{1}{2}$ "

Heidelberg Two-Color Rotary/flatbed Cylinder

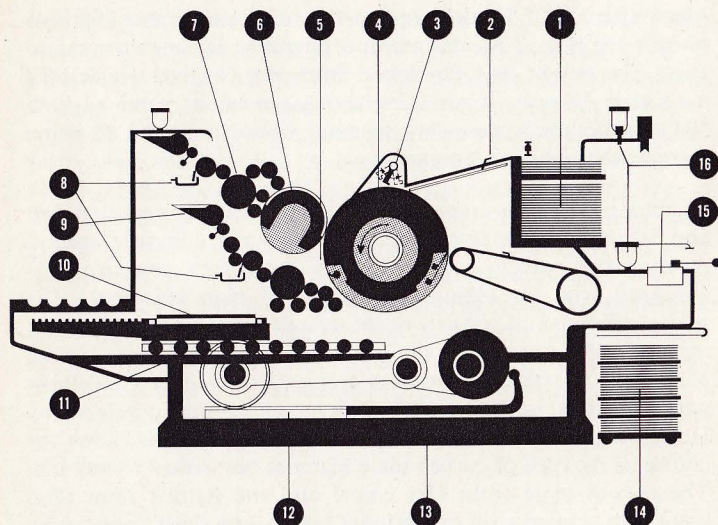
More than 3,000* Heidelberg two-color cylinders (rotary/flatbed) of both the S- and K-lines are now operating in numerous countries. The design was developed from the Original Heidelberg automatic cylinder, a machine having proved its value approx. 50,000 times, and possessing so many operational and servicing features that made it famous.

Feeding mechanism, impression cylinder, inking system, typebed and delivery were retained. Added to this was a complete, second printing unit which – operating on the rotary principle – is equipped with an inking mechanism of high efficiency. The rotary printing unit consists of the cylinder core – always remaining in the machine – and the interchangeable Heidelberg curved plate shells carrying the printing forms (protected by Heidelberg patents throughout the world). This modern system developed by Heidelberg, and holding great promise for the future, allows the choice of the type of curved plate material best suited to any job. The curved plate form (1st color) and the flatbed form (2nd color) are printed with one gripper bite in one sheet "pass" with hairline register. The working economics of the simultaneous printing of two colors are obvious: Production output is doubled, while floor space requirements and manning are the same as with the Heidelberg single-color cylinder: 4,600 two-color sheets on S-line, 5,000 on K-line machines which is identical to 9,200 and 10,000 i.p.h.

The pressman must, naturally, first adapt himself to rotary printing. Any printer accustomed to the Heidelberg single-color machine will soon master the techniques of wet-on-wet printing.

Because of its low floor space costs the Heidelberg two-color rotary/flatbed machine can also be profitably used for single-color work. Moreover, it is available with perforating and scoring accessories.

It is intended to issue a second volume of our "Hints for the Pressman" which will chiefly deal with our two-color cylinders.



Cross section of Heidelberg two-color cylinder

① Feed pile with pre-loading device ② Positive sheet control from feed to delivery. Four travelling grippers needing no adjustment ③ Swinging grippers ④ Massive, constantly-rotating impression cylinder ⑤ No change of grippers between the two colors ⑥ Curved plate form cylinder, with removable curved plate shells, can be used for any kind of plate material ⑦ Inking system for the curved plate form with 3 form rollers inking twice in succession per printing operation ⑧ Roller washing devices for both inking systems ⑨ Inking system for the flatbed form with 4 form rollers none of which reverses on the form ⑩ Heavy typebed with freely accessible form ⑪ 4 polished bed roller tracks ⑫ Rack to synchronize typebed movement with rotation of cylinder ⑬ Heavy, reinforced base of Heidelberg special alloy casting ⑭ Delivery pile with device for continuous delivery ⑮ Central lubrication ⑯ Dry or wet spray gun.

Technical Specifications of Heidelberg Two-Color Rotary + Flatbed Cylinder (as of April 1967)

K-line

Designation	KSBZ	KSBAZ
Maximum sheet size	15 $\frac{3}{4}$ x 23"	18 x 23"
Minimum sheet size	4 $\frac{15}{16}$ x 5 $\frac{7}{8}$ "	5 $\frac{1}{2}$ x 7 $\frac{1}{16}$ "
Inside measurements		
Standard chase	15 $\frac{1}{2}$ x 21 $\frac{1}{8}$ "	17 $\frac{1}{8}$ x 21 $\frac{1}{8}$ "
Skeleton chase	15 $\frac{1}{2}$ x 21 $\frac{7}{8}$ "	17 $\frac{1}{8}$ x 21 $\frac{7}{8}$ "
between bearers	15 x 22 $\frac{3}{4}$ "	17 $\frac{1}{8}$ x 22 $\frac{3}{4}$ "
Gripper margin		
with plates pasted		
onto shells and with electros	5 $\frac{1}{16}$ —25 $\frac{5}{16}$ "	5 $\frac{1}{16}$ —25 $\frac{5}{16}$ "
with wraparound plates	7 $\frac{1}{16}$ —33 $\frac{5}{16}$ "	7 $\frac{1}{16}$ —33 $\frac{5}{16}$ "
Net weight	abt. 7,280 lbs	abt. 7,340 lbs
Maximum speed	5,000 sph two-color = 10,000 iph	5,000 sph two-color = 10,000 iph
Floor space requirements		
Length x width x height	8'4" x 4'9" x 4'9"	8'4" x 4'9" x 4'9"
Power requirements	5 kW = 6.7 HP	5 kW = 6.7 HP
Curved form data:		
2 form rollers	2" and 2 $\frac{1}{4}$ "	2" and 2 $\frac{1}{4}$ "
Max. printing surface of curved form		
for plates stuck onto shells,		
wraparound plates, combi-		
wraparound plates	15 $\frac{1}{32}$ x 22 $\frac{1}{8}$ "	17 x 22 $\frac{1}{8}$ "
for curved electros,		
plates on saddles	15 $\frac{5}{32}$ x 21 $\frac{1}{4}$ "	16 $\frac{5}{8}$ x 21 $\frac{1}{4}$ "

S-line

Designation	SBGZ	SBBZ
Maximum sheet size	22 $\frac{1}{2}$ x 30 $\frac{1}{4}$ "	22 $\frac{1}{2}$ x 32 $\frac{1}{4}$ "
Minimum sheet size	11 $\frac{1}{2}$ x 15 $\frac{3}{4}$ "	11 $\frac{1}{2}$ x 15 $\frac{3}{4}$ "
Inside measurements		
Standard chase	21 $\frac{1}{4}$ x 28 $\frac{3}{4}$ "	21 $\frac{1}{4}$ x 30 $\frac{3}{4}$ "
Skeleton chase	21 $\frac{1}{4}$ x 29 $\frac{1}{4}$ "	21 $\frac{1}{4}$ x 31 $\frac{3}{4}$ "
between bearers	21 $\frac{1}{4}$ x 30 $\frac{1}{4}$ "	21 $\frac{1}{4}$ x 32 $\frac{1}{8}$ "
Gripper margin		
with plates pasted		
onto shells and with electros	5 $\frac{1}{16}$ "	5 $\frac{1}{16}$ "
with wraparound plates	13 $\frac{1}{32}$ "	13 $\frac{1}{32}$ "
Net weight	abt. 12,400 lbs	abt. 13,300 lbs
Maximum speed		
printed sheets	4,600 sph two-color 9,200 iph	4,600 sph two-color 9,200 iph
Floor space requirements		
Length x width x height	11'6" x 6'7" x 5'1"	11'6" x 6'7" x 5'1"
Power requirements	7.5 kW = 10.2 HP	7.5 kW = 10.2 HP
Curved form data:		
3 form rollers	2 $\frac{1}{4}$ " + 2 $\frac{3}{8}$ " + 2 $\frac{1}{2}$ "	2 $\frac{1}{4}$ " + 2 $\frac{3}{8}$ " + 2 $\frac{1}{2}$ "
Max. printing area		
for plates stuck onto shells,		
wraparound plates and		
combi-wraparound plates	20 $\frac{7}{8}$ x 30"	20 $\frac{7}{8}$ x 31 $\frac{1}{2}$ "
for curved electros,		
saddle plates	20 $\frac{7}{8}$ x 29 $\frac{1}{8}$ "	20 $\frac{7}{8}$ x 30 $\frac{1}{2}$ "

1

When printing a halftone, you find that the dot is slurred towards the tail edge of the sheet. To obtain a perfect unrolling action, do you reduce the cylinder packing by one sheet which you lay under the plate?

Yes. If the halftone plate is too low, the cylinder packing would be increased to get the necessary impression, with the result that the sheet on the cylinder moves fractionally faster than the form on the bed. The printing strip of the overpacked cylinder is farther away from the center and so has to cover a longer distance than with a normally packed cylinder. Consequently, the screen dots become blurred towards the tail edge of the sheet. If the block would be adjusted too high and the packing too low, the screen dot would appear blurred towards the gripper edge of the sheet.

2

The rubber rollers are firmly encrusted with ink. Since the roller cleaning solvent proved useless, do you now try to remove the ink crust by strongly rubbing the roller with type cleaner?

No. In case of ink or vanish firmly dried on the rubber rollers, "Rollopaste" regeneration paste (supplied by your dealer) should be applied to the rollers and left on overnight. Next morning they are easily washed clean with lukewarm water, leaving a velvet-like surface. Beware of petrol or so-called ink eradicators! Type cleaner attacks the surface of the rubber rollers, while ink eradicators are incompatible with rubber and tend to destroy the structure of the rubber lining of the roller. If "Rollopaste" is not available, you may use commercial ink solvents obtainable on the market (as made by ink manufacturers), though such solvents should be left to act on the rollers for short periods only.

3

In using steel cutting or die-cutting rules on the Original Heidelberg Cylinder, should these be somewhat over typehigh?

No. For die-cutting work on the Original Heidelberg Cylinder the steel cutting rules must be typehigh. Attention should be paid to an accurately ground finish of the bottom of the rules (also refer to page 78). In our special automatic cutters and creasers however, forms with die-cutting rules over typehigh, i. e. up to .937", as customary in the packaging industry, may also be used.

4

When printing a heavy solid, the ink picks. Do you try to eliminate this problem by adding a paste reducer?

Yes. The best remedy against picking is the addition of a paste reducer as produced by ink manufacturers.

5

If the roller wash-up fluid happens to run out, will it do to use kerosene for a couple of days? Or turpentine? Or soapy water?

For just a few days you can manage with a fluid consisting of 50 % petrol and 50 % kerosene. Kerosene alone is too oily, i. e. the oil film on the steel rollers would work against the distribution of stiff inks. Turpentine is much too expensive. Soapy water won't do, as it will not dissolve oil and grease.

6

When printing heavy cardboard, should the grain run the short way of the cylinder?

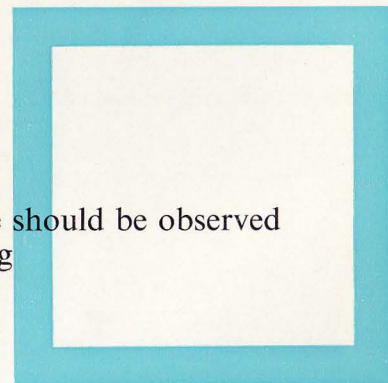
No. The grain of cardboard should run the long way of the cylinder. The sheets then can hug the cylinder, and higher printing speeds can be obtained.

7

When printing an ordinary type form, can you remove the third or fourth form rollers and produce the job with two form rollers only?

Yes. Ordinary forms and simple jobs should, of course, be run with two or three form rollers only. You will thus save the rollers, only for real quality work are three or four form rollers needed.

What else should be observed
in printing



Treatment of Rubber Rollers

During a number of years of co-operation with many firms supplying equipment and materials to the printing industry, we have been able to suggest numerous improvements in the printer's equipment and printing aids. Rubber rollers are a case in point. They are now standard with our Original Heidelberg cylinders. We have come to realize that these rollers are the very best available. Experiments over an extensive period have proved that only with such rollers best results at top speeds can be obtained. Rubber rollers are nowadays the most versatile rollers in all letterpress printing. Their resilience and tack are not only as good as, but are often better than composition rollers. For inking large solids, the performance of rubber rollers surpasses that of gelatine or synthetic rollers.

Six important requirements must be fulfilled by rollers on modern high-speed printing machines:

1. Temperature stability
2. Resistance to moisture
3. Resistance to oil and kerosene
4. Resilience
5. Softness and tack
6. Long working life

An objective comparison shows that rubber rollers emerge with a clear advantage. A printer wrote us on this subject as follows: "In general we have encountered no difficulties with rubber rollers. On the contrary, their qualities have made inking of large forms much easier. Despite long runs on a permanent two-shift system, with fluctuations of temperature, humidity, etc. we no longer experience any difficulties. This very much facilitates the printer's work. He can now concentrate on the other aspects of printing without having to keep a steady eye on the rollers. I would like to emphasize that even when changing over from black to yellow or red, it is always possible to obtain faithful tone reproductions."

Naturally, when using rubber rollers certain points do need watching, just as with gelatine or composition rollers.

1.

New rubber rollers should be slightly rubbed with linseed oil when used the first time.

2.

To avoid damage by type or rule matter, the rollers must be accurately adjusted.

3.

Only appropriate wash-up media should be used.

4.

Solvents must be used with caution, since they often contain chemicals which attack rubber and may damage the structure of the roller surface.

5.

If inks or varnishes have dried on the rollers, they should be rubbed over with "Rollopaste" after the day's work is over and cleaned with lukewarm water next morning. This will restore the velvet-like surface of the rollers.

When changing colors and especially in cases when a dark color is followed by a light one, the following routine has proved most effective in practice:

- a) Thoroughly wash the inking system and the form rollers. This can be done conveniently and quickly with the Heidelberg roller washing device.
- b) Apply to the vibrator roller some opaque white, a little stiff varnish or printing lacquer and run the inking system for a while.
- c) Re-wash the inking system and the form rollers.
- d) Put the desired ink into the ink duct. The tone of the color should then be thoroughly clean.

Some black inks are still "enriched" with aniline pigment. The solvent of these pigments causes the surface of the rollers to swell, rendering them liable to absorb ink. The dissolving power of standard wash-up fluids will be inadequate for cleaning the rollers

properly, with the result that light colors will appear dirty and dark in their shade. In such a case, after washing the rollers with a suitable solvent they should be thoroughly washed down with white spirit or a warm soapy solution. It goes without saying that the rollers must be wiped dry afterwards and the roller journals slightly greased.

Concluding, we would like to reiterate that our Original Heidelberg rollers are equipped with rubber rollers because these allow full use of the high printing capacity of our presses.

Artex rollers are synthetic composition rollers whose surfaces are not applied like those of the rubber variety. They are, like gelatine rollers, cast in tubes. By virtue of their completely unbroken surface, Artex rollers thus possess all the properties of gelatine rollers. Under adverse conditions, such as high humidity or temperature, these rollers may soften. For this reason Artex should not be used during hot summer periods or in the tropics. Compared with rubber rollers, Artex offer some definite advantages. They remove fluff from the form and are considerably more resistant to damage caused by line plates and rules. For the same reason they are more suitable for use with plunger-type numbering machines.

When using Artex, these points should be observed:

1.

Artex rollers have extraordinary tack. They should, therefore, be stored free-standing, never in contact with paper. If, however, paper happens to stick to the Artex surface, it can easily be removed with a wash-up fluid.

2.

Like gelatine and rubber rollers, Artex must be carefully adjusted. If the pressure setting is too tight, excessive heat will be produced and this may cause the surface to break up. Since Artex rollers remain constant in diameter, no readjustment is required. The rollers can be used for runs immediately, without preparation.

3.

Artex rollers are fully resistant to all inks formulated on a mineral or linseed oil base. They are also virtually color-proof, in the sense that light colors can be run after dark colors without fear of degradation.

4.

Artex rollers must never be run dry. A little grease or a drop of oil will protect those parts of the surface that receive no ink.

If the machine is stopped for any length of time, the rollers should be thoroughly washed and disengaged from the distributing rollers.

5.

The material of Artex rollers is subject to natural aging. This causes it to soften gradually, even if the rollers are not used. It is, therefore, advisable to put them into service as soon as they are received. Artex rollers cannot be reground.

6.

White spirit is generally recommended as a wash-up fluid. A small quantity is required to clean Artex rollers speedily and thoroughly. Their ends should be cleaned as well.

Never use wash-up media containing aromatic hydrocarbons, such as benzole, toluole or rotogravure ink thinners, etc.

7.

"Rollopaste" and similar alkaline ink solvents should not be used on Artex rollers, as they would attack their surface.

Levelling-up

Before starting the make-ready, uniform pressure must be achieved over the entire area of the form (levelling-up): Areas printing light are patched with one or several layers of tissue paper. Levelling-up should, at least partly, be made under the form, if possible. If levelling-up is to be made in the packing, it is normally pasted on the sheet to which the mechanical overlay is to be fixed (see page 105).

Levelling-up is followed by "differentiation" which ensures that the various form areas receive greater pressure than others, in accordance with the heaviness of the image and the "contrast" impression required. In illustration printing this kind of differentiation is named "mechanical make-ready". The most common methods of producing a mechanical make-ready are:

Hand-cut overlays

We first give a description of a hand-cut overlay, with a little practice it can quickly and with comparative ease be made from four sheets of bank paper.

The heaviest areas of the halftone are cut out and pasted on a printed sheet (Illustration 1).

From the second sheet, the heavy and middle tones are neatly



1

cut (Illustration 2). These, too, are pasted on the printed sheet (over the cut-outs representing the heavy tones).

From the third sheet cut the areas representing the highlights, to ensure that they will be printed under less pressure (Illustration 3). Then paste this sheet as well on the lowermost sheet which will give a contrast pressure, in accordance with the tonal values.

This hand-cut overlay which, when made by an experienced printer, will produce even the finest details, is now pasted on the tympan or base sheet held in place by the packing clamp. Cover it with the packing, and the rubber blanket, made up as described on page 29. To avoid the packing from becoming too thick through levelling-up and the mechanical make-ready, a few sheets should, of course, be extracted from the packing.

Mechanical chalk relief make-ready (MCR)

While in recent years the task of making the equalizing packing was considerably eased through new methods of form preparation and other systems, the demands made upon mechanical make-ready have risen due to recent improvements and refinements in plate production, also because runs have tended to lengthen and quality standards have gone up. Moreover, modern printing demands reliable, simple and time-saving preparation of



2



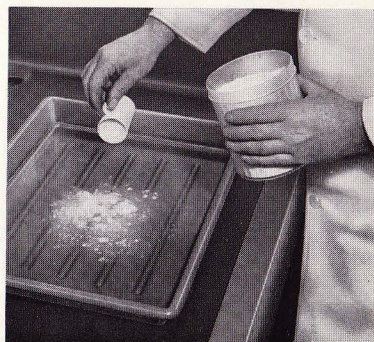
3

illustrations. The full potential tone range of photographs must be reproduced brilliantly and maintained through out the run. The underlying principle of mechanical make-ready with chalk is that, just as with hand-cut overlays, dark tones require heavier pressure than highlights. Chalk make-ready is a method meeting these requirements extremely well and simple to carry out. The foil is available in overall thickness ranging from .006" to .014". After having ensured that the plate prints evenly over the whole area, make two impressions in true register on to the same foil. Normal ink with a colorless MCR make-ready additive may be used, or plain MCR ink, without any additive. The printed foil should be dusted down with French chalk or talcum.

The foil is developed in a bath made up of water of 68° F (luke-warm) and a MCR etching powder, following the instructions supplied with the powder.

Before placing the foil into the etching solution, rinse it with clean water on both sides. This will ensure that the foils is evenly wetted by the solution.

Immerse the foil in the solution in one swift movement, seeing to it that both sides of the foil are covered by the solution at once. Agitate it throughout the developing period. Turn it periodically, holding it along the unprinted margins. With the new foils

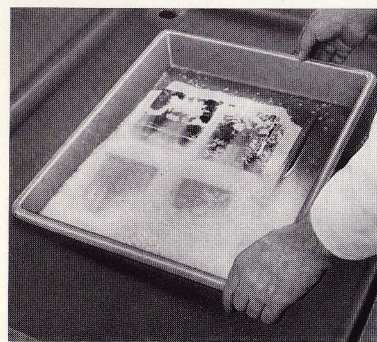


1 Preparing the MCR etching solution

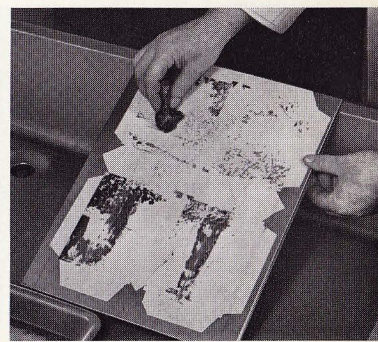
2 Etching of MCR foil

3 Application of talcum powder to the dry foil

1



2



3

available now, development is complete when the pink paper surface below the coating becomes visible, while the halftones appear white in various tone gradations, and the heavy shadows are still covered with etching ink. With the plates previously used the white paper base was exposed first during the etching process, while halftones appeared pink. The new foils offer the advantage that they retain their exact size.

On withdrawing the developed foil from the bath, rinse it well in clean water and dry it between sheets of blotting paper. Then dust the foil down with French chalk or talcum. The foil can be re-used any number of times.

Primaton make-ready

Primaton is a make-ready method involving a thermoplastic powder fused to the paper base by heat.

For printing on art paper, use the white powder grade 1 (grain size .0044") or grade 1a (grain size .0032"). For uncoated or rough paper and cardboards grade 2 (grain size .0059") or grade 3 (grain size .0079") should be used.

Any good-quality wood-free calendered paper of about 60 lbs. is suitable as base for Primaton make-ready. The impression can be pulled with ordinary ink of good quality, with a few drops of

FIEGSOL blending agent spread, if necessary, on the rollers. A special make-ready ink is also available.

Uniform impression over the entire area and accurately-adjusted rollers are, naturally, an essential to successful use of Primaton make-ready.

For color work involving very delicate hues, the blue powder grade 0 alone (grain sizes ranging from .002" to a maximum of .004") results in very finely graduated reliefs.

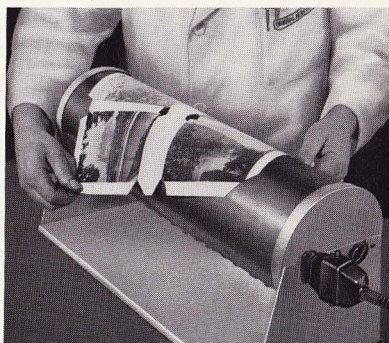
How to use the Primaton method

Take a pull on art paper from the thoroughly inked form with normal pressure, to check if impression is correct. Remove form rollers, then take a pull on a sheet of M. F. paper without allowing the form rollers to touch the form again. Now pour plenty of white powder over the imprinted sheet in a flat tray. In a to and fro motion with a brush held vertically, lightly remove the powder from the halftones and highlights. Leave powder in the heavier areas only. Place the sheet on a piece of stiff card and lightly brush off all excess powder. Pour blue powder grade 0 over the sheet through an 0-grade sieve, reverse the sheet and shake it well, face down, over the tray. Apart from toning down the edges which

Brushing on of Primaton powder



Fusing the Primaton relief over the heater



might otherwise print too heavily, with a soft brush, no further retouching should be necessary. After removing all traces of powder from the reverse side of the sheet, it can be fused over a heater which should have a constant temperature of about 265° F to 320° F.

A second method has proved successful, too: As soon as the form prints evenly, cut the ink supply and run the machine until it is nearly "blind". Now apply a little stiff varnish to the rollers and allow it to work in thoroughly with the remaining ink. Take a pull on a woodfree paper to check if impression and inking are correct. Clean the form by means of a brush and re-ink with the form rollers. Wait for 5 minutes.

See to it that, during this procedure, the form rollers do not touch the form again, i. e. they must be removed after the form is inked. After 5 minutes take a pull, treating it immediately, first with white and then with blue powder, and fuse it.

The five-minute interval has the effect of bringing the ink on the highlight dots of the plate to such fine points that hardly any powder will stick to them. It will therefore be easier for the printer to remove the powder from the highlight areas.

3 M make-ready

For producing the 3 M make-ready you need two things: the make-ready foil and a heater unit. The foil is a semi-carton on one side of which a thermoplastic layer is glued. This layer is elastic, has a smooth surface and takes ink well. After the printer has positioned the material accurately, he takes an impression of the plate, using any good halftone ink, including colors. Inking should not be heavier than for the normal run.

Given proper pre-make-ready, no further levelling-up will be necessary. Since it is recommended that the packing for 3 M make-ready should be increased by one or two .0025" sheets, the elastic nature of the foil will absorb all minor irregularities. If the necessary adjustment exceeds two or three sheets of tissue paper, proper pre-make-ready should be carried out. When a suitable pull

has so been taken, it is fed into the 3M heater unit without any intermediate treatment. Exceptions, are pulls made with colored inks. To render these sensitive to heat, apply black 3M pigment powder to the pull. Subsequently remove any excess powder, preferably with a clean wad of cotton wool. Carefully rub this over the powdered sheet until a dull sheen is obtained.

The heater unit has an infra-red radiant heating bar mounted in a reflector with mirror finish. When the heater is switched on, the bar will glow and the foil feed mechanism starts to operate. A voltmeter, mounted at the top left of the unit, indicates the instantaneous voltage, while below it a temperature gauge indicates the temperature of the reflector. The make-ready foil, inserted into the feed slot, is gripped by the feed mechanism and carried along underneath the infra-red heating bar at a uniform

Inserting the printed 3M foil into make-ready device



speed. After one single cycle the finished foil emerges from the delivery slot (see illustrations on pages 110-111).

During its passage under the reflector, the foil absorbs more or less heat in various parts, depending on the density of ink on the material (full solids, three-quarter- and halftones). In proportion to the heat absorbed by the ink, the thermoplastic layer of the foil swells to form an overlay corresponding to the various tonal values. If corrections are needed, the speed of the foil feed can be changed by manual adjustment, according to a graduated scale.

Removal of finished 3M make-ready



General

The best temperature for machine rooms is between 68° F and 72° F, with the relative humidity ranging from 60 to 65 per cent. It is, above all, essential that both temperature and humidity should reach those values as closely as possible and be maintained at a uniform level, not only during working shifts, also at nights and during holidays. Low temperatures at the beginning of a shift can cause difficulties with inks, rollers and paper and these will persist until normal conditions are restored. Under variable conditions paper tends to become charged with static electricity which is often the source of considerable trouble. Thin papers are quite frequently charged during printing, which means that they will behave normally on the feed table but cause trouble during delivery.

Various methods to overcome static

Original Heidelberg Cylinders have a feed board made of aluminum alloy. This eliminates stoppages caused through paper becoming charged with static electricity. Besides, each sheet is positively guided through the press by grippers, instead of merely being carried by rolls or tapes. It cannot then "stick" to any part of the machine due to being charged with electricity. The only point when the sheet is not positively guided is during alignment against the lays of the feed board. As already stated, the metal feed board will neutralize any static built up on the sheet, thus allowing the sheet to be properly fed forward by the lay guides without sticking which might lead to bad register.

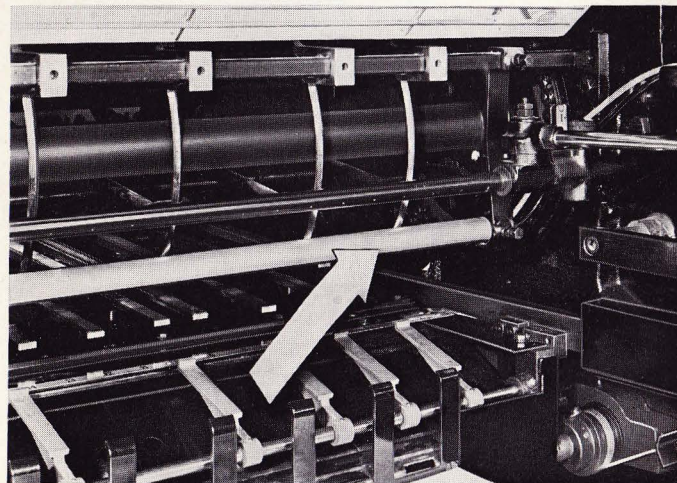
Since static electricity can nevertheless be tricky and quite unpredictable, we think it advisable to explain the measures to be taken to deal with the results of static or reduce it to a tolerable limit.

Printers use various methods for coping with static electricity, though none of them will eliminate the difficulties reliably. It is simply a matter of trying different remedies until the best solution is found for the specific case.

As already stated, the accumulation of a static charge on paper is connected with climatic conditions in the printshop. Static will arise when the air is too dry. It is therefore important to remedy this drawback. If no automatic humidity control equipment exists in the printshop, the printer sometimes resorts to a primitive, yet not entirely ineffective cure. He sprinkles the floor with water. As it evaporates, the moisture content of the air is increased. This method is not fully reliable, since the moisture content of the air cannot be accurately controlled, and a damp floor may also create other difficulties.

In order to eliminate the accumulation of a static charge on paper while it passes the cylinder brush of the Original Heidelberg Cylinder, printers sometimes rub glycerine or kerosene over the top sheet of the cylinder packing. If this is done, a sheet of oil paper should be placed under the top sheet, thus insulating the underlying packing, which might otherwise be soaked with

Static neutralizing probe



grase, become spongy and cause new difficulties. Some suppliers also offer special anti-static compounds, i. e. mostly liquids to be rubbed over the packing. All such media have the drawback that they require the machine to be regularly stopped, to permit the compound to be rubbed over the top sheet again and again.

Finally, an aluminum foil can be used to form the top sheet of the packing which will neutralize static electricity. The aluminum foil should then be conductively connected to the bare cylinder surface, while the brush must not be adjusted too tightly.

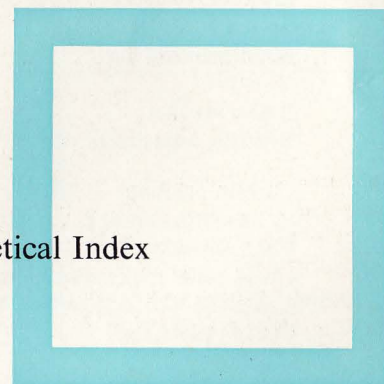
Static neutralizing equipment

A very effective remedy is the use of static neutralizing equipment. For our automatic cylinders, we recommend the fitting of high-frequency probes obtainable on the market. These are electrically powered units. The effect, particularly with light-weight stock and onion skin, is really amazing, because the static electricity in the paper is dissipated by ionizing the surrounding air. Any residual electric charge is drained off completely, this allowing neat stacking of the printed sheets.

After elimination of the static charge the speed can, as a rule, be considerably increased. The resulting higher production output will soon pay for the cost of the high-frequency probe.

The illustration (page 113) shows this probe over the delivery pile of a $22\frac{1}{2} \times 30\frac{1}{4}$ " Heidelberg cylinder. Your Heidelberg representative will be glad to name you suitable suppliers of static neutralizing probes.

Alphabetical Index



- 15 Adhesive foil, double-sided
- 12 Adjusting the form
- 13 Adjusting plate to correct type height
- 86 Adjusting rules to correct type height
- 14 Answers to Quiz questions on page 61
- 102 Artex rollers
- 27 Automatic impression lever control
- 86 Adjusting die-cutting form and cutting rules to type height
- 55 Blast air, delivery
- 55 Blast air, feeder
- 43 Blind printing line
- 101
- 19 Brake brushes
- 24 Brushes, adjustment of
- 67 Carbon printing
- 57 Cardboard, running
- 64 Centrally-driven numbering machines
- 105 Chalk relief make-ready, mechanical (MCR)
- 87 Crosswise and lengthwise perforation, simultaneous . . .
- 91 Curved plate shell
- 75 Cutting
- 22 Cylinder brush
- 75 Die-cutting
- 75 Die-cutting cylinder, automatic
- 76 Die-cutting jacket
- 77 Die-cutting rules
- 77 Die-cutting rules, adjusting . . . to type height
- 20 Double-sheet gauge
- 15 Double-sided adhesive tape
- 39 Drier additive
- 68 Embossing
- 68 Embossing die

- 17 Feed, adjustment of
- 12 Form, accurately adjusted
- 59 Form positioning devices
- 32 Form rollers
- 35 Four-color jobs
- 22 Front lay adjustment
- 42 Ghosting
- 34 Grain of paper
- 32 Half-tone printing
- 72 Heating plate
- 14 Honeycomb bases
- 71 Hot embossing
- 34 Illustrations, printing of
- 27 Impression lever control
- 73 Infra-red heating device
- 67 Ink fountain heater
- 32 Inks for single-color half-tone printing
- 87 Lengthwise and crosswise perforating, simultaneous . . .
- 40 Lock-up, six-point
- 110 3 M make-ready
- 27 Make-ready sheet, positioning of
- 104 Make-ready systems
- 77 Make-ready for die-cutting jobs
- 28 Make-ready time, reduction of . . .
- 69 Male die for embossing
- 105 Mechanical chalk relief make-ready (MCR)
- 34 Multi-color jobs, packing for . . .
- 34 Multi-color printing
- 64 Numbering
- 55 Onion skin

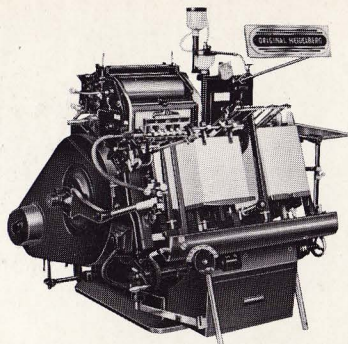
- 29 Packing
- 30 Packing, composition of
- 29 Packing thickness
- 50 Paper creasing
- 17 Paper feed
- 32, 34 Paper for various jobs
- 82 Perforating devices
- 82 Perforating, simultaneous printing and . . .
- 64 Plunger operated numbering machines
- 87 Perforating rules
- 13 Plate mounting
- 27 Positioning of make-ready sheet
- 37 Production runs, inking of
- 107 Primaton make-ready
- 39 Printing aids
- 41 Printing of mixed forms
- 34 Printing of multi-color jobs
- 42 Printing of solids
- 32 Printing of single-color half-tones
- 55 Printing of thin stock
- 38 Printing properties of ink
- 36 Progressive proofs
- 81 Protective and make ready plate
- 61 Quiz questions
- 17 Register, keeping true . . .
- 42 Repeat marks
- 101 Roller cleaning solvent
- 103 "Rollopaste" ink eliminator
- 99 Rubber rollers, their treatment and care
- 57 Rubber suckers for cardboard printing or processing
- 57 Running cardboard
- 88 Scoring, simultaneous die-cutting and . . . or creasing
- 34 Sequence of colors in multi-color printing
- 26 Set off, remedy against

- 55 Sheet separation, accessory for
- 15 Shifting of plates
- 17 Side-lay adjustment
- 79 Simultaneous die-cutting, creasing or scoring
- 82 Simultaneous perforating and printing
- 19 Sheet smoother
- 48 Slur caused by high form rollers
- 52 Slur caused by high or low plates
- 48 Slur caused by ink being too tacky
- 50 Slur caused by sheet slipping
- 47 Slur caused by too much ink
- 47 Slur problems
- 30 Solids, packing for printing . . .
- 42 Solids, printing of
- 38 Spirit varnish
- 38 Spraying
- 33 Spraying of printed sheets
- 15 Springing of plates
- 113 Static electricity
- 115 Static neutralizing equipment
- 26 Strip of sponge rubber
- 90 Technical specifications of die-cutting cylinder
- 11 Technical specifications of single-color cylinder
- 93 Technical specifications of two-color cylinder
- 55 Thin stock, processing of
- 37 Tonal scale for multi-color jobs
- 23 Top sheet
- 63 Two-up feed
- 12 Unrolling action of impression cylinder

Heidelberg Range of Presses*

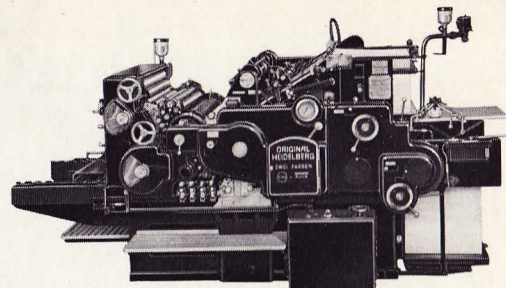


* As of May 1967



T/GT/GTK

Original Heidelberg Automatic Platens
10 x 15" and 13 x 18"
Maximum speed:
5,500 and 4,000 iph

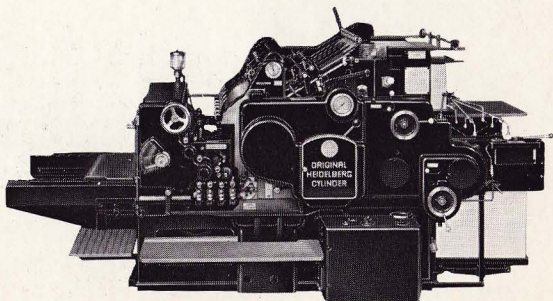


**KSBZ/KSBAZ
SBGZ/SBBZ**

Heidelberg Two-Color
Automatic Cylinders, rotary + flatbed
15³/₄ x 23"; 18 x 23"
Maximum speed:
5,000 iph two-color = 10,000 iph
22¹/₂ x 30¹/₄"; 22¹/₂ x 32¹/₄"
Maximum speed:
4,600 iph two-color = 9,200 iph

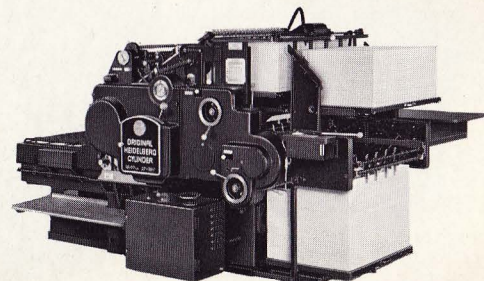
**KSB / KSBA
SBG / SBB**

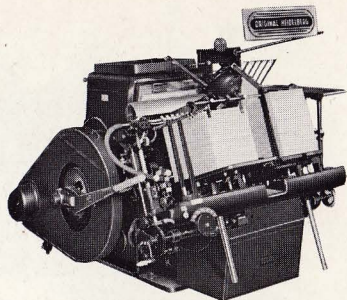
Heidelberg Single-Color
Automatic Cylinders
15³/₄ x 23"; 18 x 23"
Maximum speed: 5,000 iph
22¹/₂ x 30¹/₄"; 22¹/₂ x 32¹/₄"
Maximum speed: 4,600 iph



SBBS

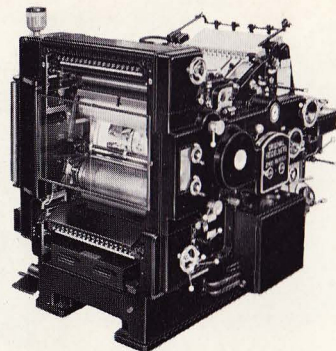
Heidelberg Cylinder Cutter and Creaser
22¹/₂ x 32¹/₄"
Maximum die-cutting speed:
4,600 iph





GTS

13 x 18" Original Heidelberg Platen
Cutter and Creaser
Maximum speed: 4,000 iph

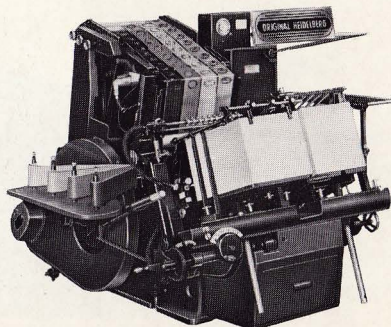


KRZ

15³/₄ x 22¹/₂" Heidelberg Two-Color
Sheet-fed Rotary
Maximum speed:
5,500 iph two-color = 11,000 iph

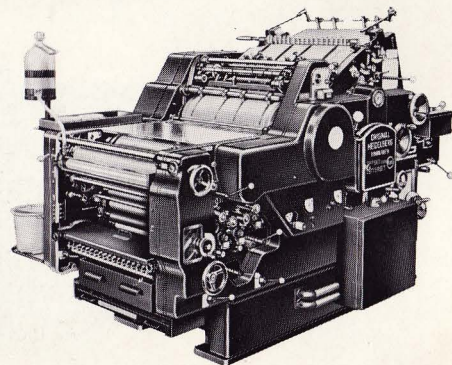
13 x 18" Heidelberg Special Cutter and
Creaser for Foil Stamping and Hot
Embossing
Maximum speed: 4,000 iph

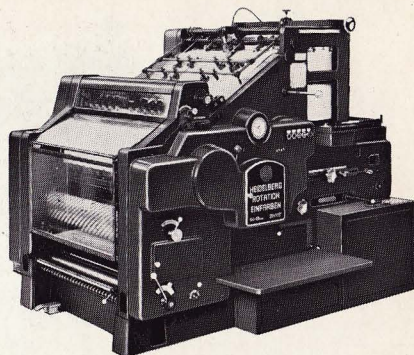
GTP



**KOR / KORA
KORD / KORS**

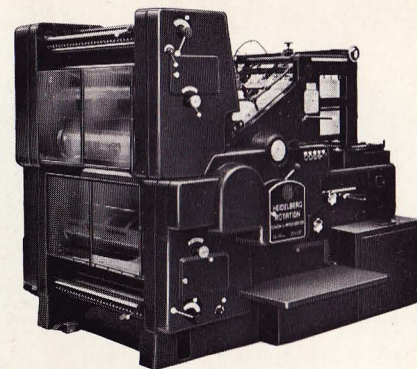
Heidelberg Single-Color Sheet-fed
Rotary for Offset or Letterset
15³/₄ x 22¹/₂" ; 18 x 22¹/₂" ; 18 x 25¹/₄" ;
20¹/₂ x 28"
Maximum speed: 5,500 iph





SRDE

25 $\frac{1}{4}$ x 35"
Heidelberg Single-color Rotary
Maximum speed: 5,500 iph

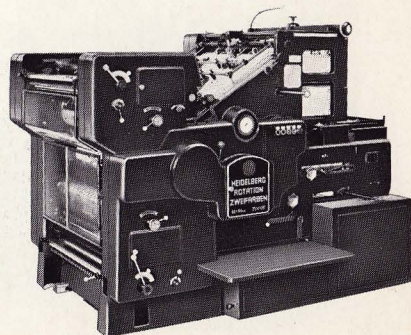


SRDW

25 $\frac{1}{4}$ x 35"
Heidelberg Perfecting Rotary
Maximum speed: 5,500 iph
(front and back page) = 11,000 iph

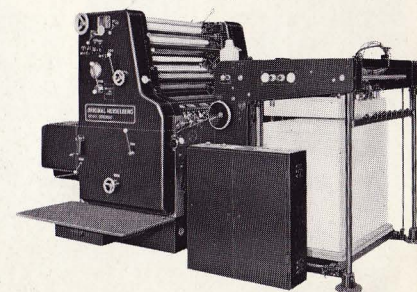
SRDZ

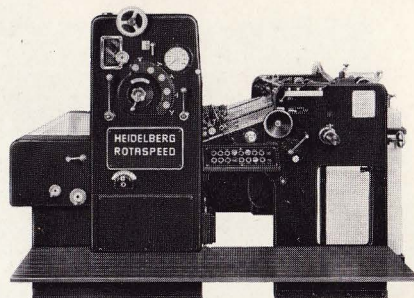
25 $\frac{1}{4}$ x 35"
Heidelberg Two-color Rotary
Maximum speed:
5,500 sph two-color = 11,000 iph



SOR / SORD

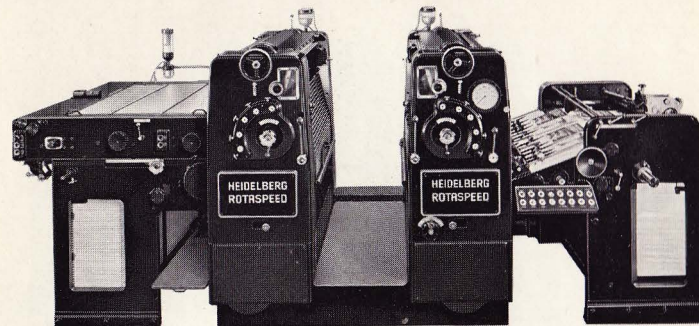
24 x 32 $\frac{1}{4}$ " or 24 x 30"; 25 $\frac{1}{4}$ x 35"
Heidelberg Single-color Sheet-fed
Rotary for Offset or Letterset
Maximum speed: 8,000 iph





REN

28 x 40" Heidelberg Rotaspeed Single-Color Letterpress Standard Pile
Maximum speed: 8,000 iph

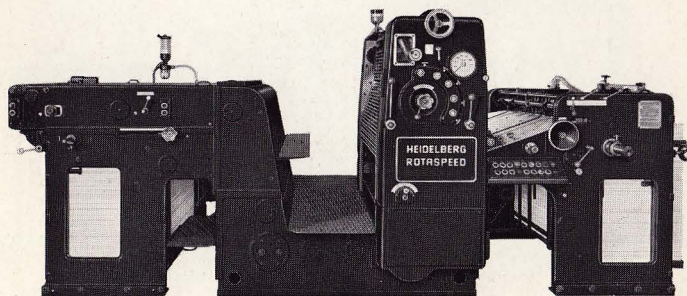


RZB

28 x 40" Heidelberg Rotaspeed Two-Color Letterpress
Maximum speed:
7,000 iph two-color = 14,000 iph

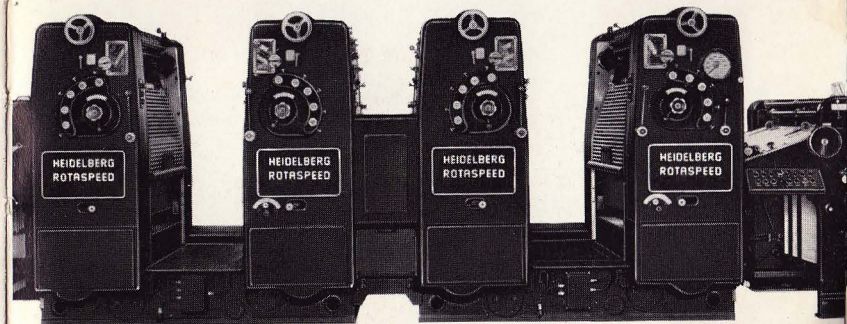
28 x 40" Heidelberg Rotaspeed Single-Color Letterpress High Pile
Maximum speed: 8,000 iph

REH

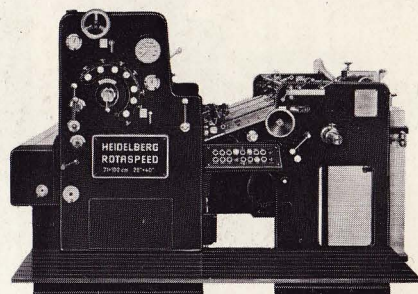


RVB

28 x 40" Heidelberg Rotaspeed Four-Color Letterpress
Maximum speed:
7,000 iph four-color = 28,000 iph



All Heidelberg Rotaspeed Offset Machines can be

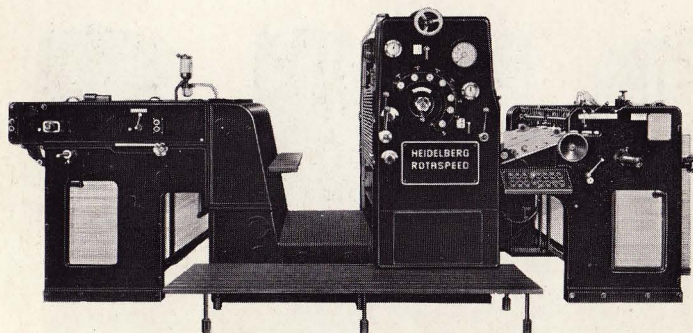


RON

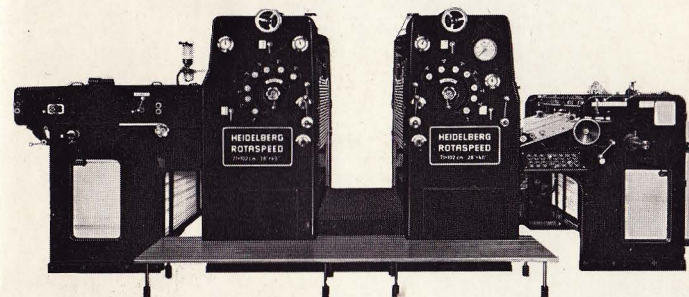
28 x 40" Heidelberg Rotaspeed Single-Color Offset Standard pile, or in combination with letterset
Maximum speed: 8,000 iph

28 x 40" Heidelberg Rotaspeed Single-Color Offset High pile, or in combination with letterset
Maximum speed: 8,000 iph

ROH



supplied in combination with letterpress printing units

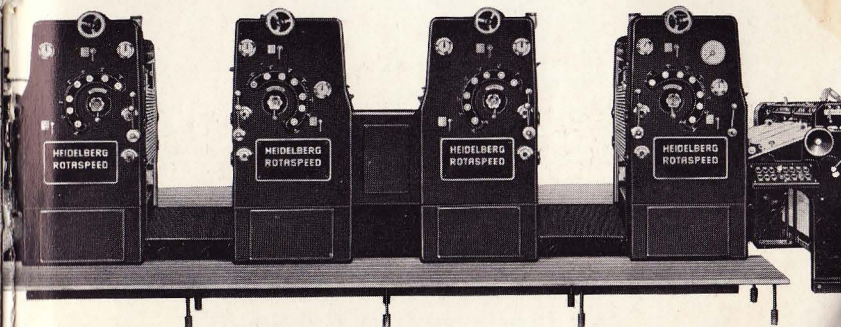


RZO

28 x 40" Heidelberg Rotaspeed Two-Color Offset, or in combination with letterset
Maximum speed:
7,000 iph two-color = 14,000 iph

28 x 40" Heidelberg Rotaspeed Four-Color Offset, or in combination with letterset
Maximum speed:
7,000 iph four-color = 28,000 iph

RVO



Issued by Schnellpressenfabrik AG Heidelberg. Printed on single and
two-color rotary and flatbed cylinder presses $22\frac{1}{2} \times 30\frac{1}{4}$ " and
 $22\frac{1}{2} \times 32\frac{1}{4}$ "

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Printed in Western Germany 210/67/a